

REPORT  
ON THE  
COTTON PRODUCTION OF THE STATE OF TENNESSEE,  
WITH A DISCUSSION OF  
ITS GENERAL AGRICULTURAL FEATURES,  
AND A NOTE ON  
COTTON PRODUCTION IN THE STATE OF KENTUCKY.

BY

JAMES M. SAFFORD, A. M., PH. D., M. D.,

STATE GEOLOGIST OF TENNESSEE, PROFESSOR OF GEOLOGY AND NATURAL HISTORY IN VANDERBILT UNIVERSITY,

AND

SPECIAL CENSUS AGENT.

# TABLE OF CONTENTS.

LETTERS OF TRANSMITTAL .....	Page. v
TABULATED RESULTS OF THE ENUMERATION .....	1-8
TABLE I.—Area, Population, Tilled Land, and Cotton Production .....	3-5
TABLE II.—Acreage and Production of Leading Crops .....	6-8

## PART I.

PHYSICO-GEOGRAPHICAL AND AGRICULTURAL FEATURES OF THE STATE OF TENNESSEE .....	9-44
Outlines of the Physical Geography of Tennessee .....	14-40
Variety of Natural Features .....	11
General Topography and Elevation .....	11, 12
Climate .....	12, 13
Rocks and Soils in General .....	13
The Natural Divisions of the State .....	13, 14
The Mississippi Bottom Region .....	14-16
The Upland or Plateau Slope of West Tennessee .....	16-23
The Bluff Region .....	17-19
The Brown-loam Table-lands .....	19-21
The Summit Region of the Water-shed .....	21-23
Flatwoods Belt .....	21
Sandy Pine and Oak Uplands .....	21
Black Prairie Belt .....	21, 22
Eastern Sandy Pine and Oak Uplands .....	22
The Western Valley of the Tennessee River .....	23-25
The Highland Rim .....	25-28
Siliceous Lands .....	26
Calcareous Red Clay .....	26, 27
The Central Basin .....	28-35
Central Limestone Division .....	29, 30
Cedar Glade Lands .....	30
Carter's Creek Limestone Lands .....	30
Orthis Limestone Lands .....	31, 32
Mulatto Lands of the Nashville Series .....	32, 33
The Cumberland Table-land .....	35, 36
The Valley of East Tennessee .....	36-39
The Unaka Mountain Region .....	39, 40
REMARKS ON COTTON ACREAGE AND PRODUCTION .....	40-43
TABLE III.—Population and Cotton Production in each Agricultural Region .....	40
TABLE IV.—“Banner counties,” as regards Total Production and Product Per Acre, in each Agricultural Region .....	41
Relations of Cotton Production to the Races .....	42
Methods of Cotton Culture .....	42, 43
Table of Analyses of Soils and Subsoils .....	44

## PART II.

AGRICULTURAL DESCRIPTIONS OF THE COUNTIES OF TENNESSEE .....	45-92
Alluvial Plain of the Mississippi River .....	47, 48
Mississippi Alluvium (in part) and Bluff Region .....	49-53
Brown-loam Table-lands .....	54-62
Summit Region of the Water-shed .....	63-69
Western Valley of the Tennessee River .....	69-74
Highland Rim (Western Subdivision) .....	75-78
Highland Rim (Eastern Subdivision) .....	78-80
The Central Basin .....	80-91
Cumberland Table-land, Valley of East Tennessee and the Unaka Mountain Regions .....	92

## TABLE OF CONTENTS.

## PART III.

	Page.
CULTURAL AND ECONOMIC DETAILS OF COTTON PRODUCTION .....	93-105
Reference Table of Reports Received from Tennessee Counties.....	94-96
Summary of Answers to Schedule Questions .....	97-105
Tillage, Improvement, etc.....	97, 98
Planting and Cultivation of Cotton.....	99, 100
Ginning, Baling, and Shipping.....	101, 102
Diseases, Insect Enemies, etc .....	102, 103
Labor and System of Farming.....	103-105

## KENTUCKY.

NOTE ON THE COTTON PRODUCTION OF KENTUCKY .....	107-112
TABLE I.—Area, Population, and Cotton Production of the Cotton-producing Counties.....	109
TABLE II.—Acreage and Production of the Leading Crops of the Cotton-producing Counties .....	110
COTTON PRODUCTION IN KENTUCKY .....	111, 112

## MAPS AND ILLUSTRATIONS.

MAP SHOWING AGRICULTURAL REGIONS .....	11
MAP SHOWING INTENSITY OF COTTON ACREAGE.....	40
DIAGRAM SHOWING DIVISIONS OF THE STATE.....	11

## LETTERS OF TRANSMITTAL.

---

BERKELEY, CALIFORNIA, *June 1, 1883.*

The SUPERINTENDENT OF CENSUS.

DEAR SIR: I have the honor to transmit herewith a report on the cotton production and agricultural features of the state of Tennessee by Professor James M. Safford, of Vanderbilt University, and state geologist, acting as special agent for the census.

Professor Safford's previous publications and reports on the geology and agriculture of Tennessee are well known to the public, and his labors in that connection have rendered his co-operation in the present series of reports doubly important and acceptable. While much of the subject-matter may be found in former publications, the compact form in which it is here presented, in connection with the predominant productive industry of the western slope, renders it interesting and available to a wider circle of readers, and will convey even to the specialist a more graphic conception of the varied features of the state than he has heretofore been enabled to compile from data scattered through various works. Agriculturally, politically, and geologically, the cross-section of the eastern valley of the Mississippi here afforded by Tennessee is extremely interesting and instructive.

Very respectfully,

E. W. HILGARD,  
*Special Agent in charge of Cotton Production.*

---

NASHVILLE, TENNESSEE, *May 1, 1883.*

Professor EUGENE W. HILGARD,

*Special Agent in charge of Cotton Production.*

SIR: I have the honor to submit herewith a report on cotton production in the state of Tennessee, with a discussion of the general natural features of the state, so far as they may be related to cotton culture; also a note on cotton production in Kentucky. I have endeavored, in the preparation of the report, to follow out your instructions as to plan and matter, and trust you may find its contents, for the most part at least, in accordance therewith. Had it been allowed to give the report greater length, much more might have been said, omissions supplied, and some of the more practical parts expanded. It may be better, however, as it is.

So little of Kentucky is within the cotton region proper that it has not been considered desirable or pertinent to give any extended notice of that state as a whole in its relation to cotton culture. Such notice would be quite appropriate were tobacco the subject-matter in question. A narrow area, however, in the southwestern part of the state, contiguous to Tennessee, and forming the extreme northern limit of the cotton-growing region of the eastern Mississippi valley, has received due attention.

In the preparation of the report, the chief sources of information, besides the data supplied by the Census Office and the answers and notes of correspondents in the returned schedules, have been my own reports on the geology of Tennessee and personal knowledge of the state outside of these, the geological reports of Kentucky, and your own reports and papers on the geology of Mississippi and neighboring states.

In conclusion, I desire to express my obligations to yourself, Dr. R. H. Loughridge, Dr. Eugene A. Smith, of the University of Alabama, and Messrs. John R. Proctor and W. M. Linney, of the Kentucky geological survey, for special favors received.

Very respectfully, your obedient servant,

JAMES M. SAFFORD.



---

---

# TABULATED RESULTS OF THE ENUMERATION.

---

TABLE I.—AREA, POPULATION, TILLED LAND, AND COTTON PRODUCTION.

TABLE II.—ACREAGE AND PRODUCTION OF LEADING CROPS.

# TABULATED RESULTS OF THE ENUMERATION.

3

TABLE I.—AREA, POPULATION, TILLED LAND, AND COTTON PRODUCTION.

Counties.	Land area.	POPULATION.						TILLED LAND.		COTTON PRODUCTION.							Cotton acreage per square mile.
		Total.	Male.	Female.	White.	Color'd.	Average per square mile.	Acres.	Percentage of area.	Percentage of tilled lands devoted to cotton.	Acres.	Bales.	Average per acre.				
													Bale.	Seed-cotton.	Lint.		
The State.....	Sq. mls. 41,750	1,542,359	769,277	773,082	1,138,831	403,528	36.9	7,700,041	28.82	9.38	722,562	330,621	0.46	Lbs. 651	Lbs. 217	17.3	
ALLUVIAL PLAIN OF THE MISSISSIPPI RIVER.																	
Lake .....	210	3,968	2,145	1,823	3,274	694	18.9	34,666	25.79	9.37	3,240	2,412	0.74	1,059	353	13.5	
ALLUVIAL PLAIN OF THE MISSISSIPPI RIVER AND PLATEAU STATE OF WEST TENNESSEE.																	
a. Alluvial plain and bluff.																	
Dyer.....	570	15,118	7,774	7,344	11,206	3,912	26.5	76,194	20.89	19.21	14,637	8,504	0.59	834	278	25.7	
Lauderdale .....	410	14,918	7,027	7,291	9,081	5,837	36.4	58,010	22.11	41.52	24,083	13,250	0.55	783	261	58.7	
Tipton.....	380	21,033	10,816	10,217	10,482	10,551	63.7	100,666	47.06	38.17	38,429	21,415	0.50	795	265	116.5	
Shelby.....	690	78,430	38,856	39,574	84,508	43,922	113.7	195,726	44.32	47.32	92,620	46,388	0.50	714	238	134.2	
Obion.....	540	22,912	11,375	11,087	18,841	4,071	42.4	109,857	31.79	6.01	7,259	4,225	0.58	828	276	13.4	
Total .....	2,540	152,411	76,948	75,463	84,118	63,293	60.0	540,453	33.25	32.76	177,028	93,842	0.53	756	252	69.7	
b. Brown-loam table-lands, midland counties.																	
Fayette.....	640	31,871	15,941	15,930	9,633	22,238	49.8	197,516	48.22	46.70	92,231	30,221	0.43	606	202	144.1	
Hardeman.....	610	22,021	11,491	11,430	13,813	9,608	37.0	120,437	30.85	37.27	44,885	18,937	0.42	600	200	73.6	
Haywood.....	570	26,053	12,914	13,139	8,497	17,556	45.7	137,155	37.60	36.40	49,919	23,092	0.46	660	220	87.6	
Madison.....	580	30,874	15,355	15,519	15,406	15,468	53.2	125,693	33.86	36.46	45,825	19,257	0.42	600	200	79.0	
Crockett.....	260	14,109	7,081	7,028	10,493	3,616	54.3	65,428	39.32	27.22	17,897	9,320	0.52	747	249	68.5	
Gibson.....	550	32,685	16,671	16,014	23,540	9,145	59.4	146,103	41.52	25.19	36,820	19,272	0.52	747	249	66.9	
Weakley.....	620	24,538	12,454	12,084	20,125	4,413	39.6	129,075	32.53	11.94	15,406	7,570	0.49	702	234	24.8	
Total .....	3,880	183,051	91,907	91,144	101,007	82,044	47.8	921,467	37.59	32.87	302,893	136,675	0.45	642	214	79.1	
c. Summit region of watershed.																	
Henry.....	560	22,142	11,018	11,124	15,488	6,654	40.3	133,392	37.90	9.89	13,186	5,516	0.42	597	199	24.0	
Carroll.....	550	22,103	11,014	11,089	16,524	5,579	40.2	120,231	34.16	20.55	24,711	10,505	0.43	606	202	44.9	
Henderson.....	580	17,430	8,671	8,759	14,414	3,016	30.1	93,241	25.12	23.06	22,344	9,419	0.42	600	200	38.5	
McNairy.....	600	17,271	8,605	8,666	14,845	2,426	25.0	78,800	17.84	29.36	23,135	9,419	0.41	579	193	33.5	
Total .....	2,370	78,940	39,308	39,638	61,271	17,675	33.3	425,664	28.06	19.59	83,376	34,859	0.42	597	199	35.2	
WESTERN VALLEY OF TENNESSEE RIVER.																	
Benton.....	380	9,780	4,880	4,900	9,147	633	25.7	46,425	19.09	10.60	4,923	1,801	0.37	522	174	13.0	
Decatur.....	310	8,498	4,171	4,327	7,276	1,222	27.4	37,861	19.08	14.77	5,591	2,169	0.39	552	184	18.0	
Hardin.....	610	14,793	7,334	7,459	12,776	2,018	24.3	72,446	18.56	17.75	12,859	5,345	0.42	591	197	21.1	
Perry.....	400	7,174	3,680	3,544	6,609	565	17.9	35,422	13.84	1.28	452	106	0.43	618	206	1.1	
Humphreys.....	450	11,379	5,746	5,633	9,708	1,671	25.3	53,938	18.73	0.29	155	90	0.58	828	276	0.3	
Houston.....	260	4,295	2,181	2,114	3,487	808	16.5	21,253	12.77	0.40	8	4	0.50	711	237	.....	
Stewart.....	500	12,690	6,552	6,138	9,933	2,757	25.4	53,934	16.85	0.08	45	15	0.33	474	158	0.1	
Total .....	2,910	68,009	34,494	34,115	58,935	9,074	23.6	321,279	17.25	7.48	24,033	9,620	0.40	570	190	8.3	
THE HIGHLANDS, OR HIGHLAND RIM OF MIDDLE TENNESSEE.																	
a. Western subdivision.																	
Montgomery.....	540	28,481	14,103	14,378	14,786	13,695	52.7	135,668	39.26	.....	2	2	1.00	1,425	475	.....	
Robertson.....	500	18,861	9,565	9,296	13,242	5,619	37.7	157,644	49.26	.....	.....	.....	.....	.....	.....	.....	
Cheatham.....	370	7,956	4,073	3,883	6,295	1,661	21.5	42,395	17.90	0.01	5	2	0.40	570	190	.....	
Dickson.....	630	12,460	6,365	6,095	10,229	2,231	19.8	59,651	14.79	0.05	31	13	0.42	597	199	.....	
Hickman.....	610	12,095	6,047	6,048	9,849	2,246	19.8	71,970	18.43	4.35	3,128	1,302	0.42	594	198	5.1	
Lewis.....	360	2,181	1,082	1,099	1,963	218	6.1	11,654	5.06	1.96	229	102	0.45	636	212	0.0	
Wayne.....	710	11,301	5,543	5,758	10,232	1,069	15.9	56,456	12.42	5.78	3,265	1,207	0.37	528	176	4.6	
Lawrence.....	590	10,338	5,188	5,195	9,599	784	17.6	47,855	12.67	3.82	1,330	702	0.38	546	182	3.1	
Total .....	4,310	103,718	51,966	51,752	76,195	27,523	24.1	583,298	21.15	1.46	8,490	3,330	0.39	558	186	2.0	

## COTTON PRODUCTION IN TENNESSEE.

TABLE I.—AREA, POPULATION, TILLED LAND, AND COTTON PRODUCTION—Continued.

Counties.	Land area.	POPULATION.						TILLED LAND.		COTTON PRODUCTION.						Cotton acres per square mile.
		Total.	Male.	Female.	White.	Color'd.	Average per square mile.	Acres.	Percentage of area.	Percentage of tilled lands devoted to cotton.	Acres.	Bales.	Average per acre.			
													Bale.	Seed-cotton.	Lint.	
THE HIGHLANDS, OR HIGHLAND RIM OF MIDDLE TENNESSEE—continued.																
b. Eastern subdivision.																
	Sq. mls.													Lbs.	Lbs.	
Macon .....	280	9,321	4,687	4,634	8,429	892	33.3	53,438	29.82	0.01	4	1	0.25	357	119	.....
Clay .....	260	6,987	3,508	3,479	6,588	399	26.9	41,880	25.17	.....	2	1	0.50	711	237	.....
Overton .....	540	12,153	5,980	6,173	11,811	342	25.5	73,022	21.13	0.13	95	41	0.43	615	205	0.2
Jackson .....	280	12,008	5,980	6,028	11,575	433	42.9	56,132	31.32	0.10	56	28	0.50	711	237	0.2
Putnam .....	460	11,501	5,744	5,757	10,903	598	25.0	60,817	20.66	0.02	14	4	0.29	408	136	.....
De Kalb .....	300	14,813	7,438	7,375	13,000	1,153	49.4	67,866	35.36	0.01	20	12	0.40	657	219	0.1
White .....	440	11,176	5,520	5,656	10,173	1,003	25.4	69,349	24.63	0.40	338	139	0.41	585	195	0.8
Warren .....	440	14,079	6,915	7,164	11,801	2,278	32.0	85,884	30.50	0.24	206	96	0.47	603	221	0.5
Coffee .....	300	12,804	6,337	6,557	11,104	1,730	43.0	71,051	37.01	0.08	55	20	0.36	519	173	0.2
Franklin .....	590	17,178	8,551	8,627	13,046	3,532	29.1	92,753	24.56	0.45	414	171	0.41	588	196	0.7
Total .....	3,890	122,110	60,660	61,450	109,750	12,360	31.4	672,212	27.00	0.18	1,210	513	0.42	603	201	0.3
CENTRAL BASIN.																
Giles .....	590	36,014	18,039	17,975	21,824	14,190	61.0	170,599	45.18	18.42	31,416	13,802	0.44	627	209	53.2
Lincoln .....	540	26,900	13,462	13,498	20,643	6,317	49.9	146,326	42.34	6.06	8,808	3,486	0.39	561	187	16.4
Moore .....	270	6,233	3,169	3,064	5,448	785	23.1	38,937	22.53	0.05	20	7	0.35	498	166	0.1
Bedford .....	520	26,025	12,934	13,091	18,536	7,489	50.0	164,800	49.52	1.36	2,239	940	0.42	597	199	4.3
Marshall .....	360	19,259	9,652	9,607	14,420	4,830	45.0	117,005	52.23	4.01	4,697	1,721	0.37	522	174	13.4
Maury .....	590	39,904	19,990	20,214	21,731	18,173	67.6	210,066	57.22	10.07	21,748	8,912	0.41	585	195	36.0
Williamson .....	540	28,313	14,065	14,248	15,922	12,391	52.4	158,970	46.00	7.46	11,859	4,538	0.38	546	182	22.0
Rutherford .....	590	36,741	18,136	18,605	20,248	16,493	62.3	200,040	52.98	16.32	32,657	12,414	0.38	543	181	55.4
Cannon .....	220	11,859	5,905	5,954	10,690	1,163	53.9	64,965	46.14	0.12	77	35	0.45	648	216	0.3
Davidson .....	500	70,020	38,923	40,103	47,678	31,348	158.1	139,166	43.49	2.31	3,224	1,333	0.41	588	190	6.4
Wilson .....	410	28,747	14,221	14,526	20,292	8,455	70.1	170,220	64.87	1.87	3,191	1,272	0.40	567	189	7.8
Smith .....	360	17,799	8,971	8,828	14,215	3,584	40.4	100,355	43.77	.....	.....	.....	.....	.....	.....	.....
Sumner .....	530	23,625	11,751	11,874	16,294	7,331	44.6	139,980	41.27	0.52	732	317	0.43	618	206	1.4
Trousdale .....	180	6,646	3,334	3,312	4,505	2,141	36.9	35,817	31.00	.....	1	1	1.00	1,425	475	.....
Total .....	6,190	387,151	192,252	194,899	252,461	134,090	62.5	1,863,784	47.05	6.48	120,729	48,778	0.40	576	192	19.5
CUMBERLAND TABLE-LAND.																
Fentress .....	500	5,941	3,017	2,924	5,838	103	11.9	35,967	11.24	0.02	6	2	0.33	474	158	.....
Scott .....	640	6,021	3,081	2,940	5,804	157	9.4	28,946	7.07	0.01	3	2	0.67	951	317	.....
Morgan .....	400	5,156	2,722	2,434	4,807	289	12.9	19,845	7.75	0.02	4	1	0.25	357	119	.....
Cumberland .....	690	4,538	2,291	2,247	4,496	42	0.6	15,198	3.44	.....	.....	.....	.....	.....	.....	.....
Van Buren .....	340	2,933	1,481	1,452	2,747	186	8.6	17,976	8.26	0.49	88	29	0.33	471	157	0.3
Grundy .....	400	4,592	2,518	2,074	4,154	438	11.5	14,830	5.80	0.22	32	21	0.66	936	312	0.1
Total .....	2,970	29,181	15,110	14,071	27,966	1,215	9.8	132,771	6.99	0.10	133	55	0.41	586	196	.....
CUMBERLAND TABLE-LAND, VALLEY OF EAST TENNESSEE, AND UNAKA MOUNTAIN REGION.																
a. Table-land and valley.																
Marion .....	500	10,910	5,485	5,425	9,541	1,360	21.8	47,649	14.89	0.19	89	35	0.39	561	187	0.2
Sequatchie .....	220	2,565	1,296	1,269	2,509	56	11.7	17,367	12.14	.....	.....	.....	.....	.....	.....	.....
Bledsoe .....	280	5,617	2,848	2,769	4,838	779	20.1	40,915	22.83	.....	.....	.....	.....	.....	.....	.....
Hamilton .....	370	23,642	12,025	11,617	16,239	7,403	63.9	52,020	21.97	0.03	486	143	0.29	420	140	1.3
Rhea .....	340	7,073	3,550	3,514	6,300	773	20.8	40,956	18.82	0.02	9	4	0.44	633	211	.....
Anderson .....	440	10,820	5,441	5,379	9,917	903	24.6	58,823	20.82	0.10	60	38	0.63	903	301	0.1
Campbell .....	400	10,095	4,989	5,106	9,574	434	25.0	53,730	20.90	0.01	4	1	0.25	357	119	.....
Claiborne .....	340	13,373	6,684	6,689	12,524	789	39.3	64,420	29.60	0.02	13	5	0.38	549	183	.....
Total .....	2,890	84,005	42,327	41,678	71,499	12,506	29.1	375,400	20.30	0.18	601	220	0.34	486	162	0.2
b. Valley.																
James .....	200	5,187	2,580	2,607	4,478	709	26.9	32,505	25.39	.....	.....	.....	.....	.....	.....	.....
Bradley .....	340	12,124	5,894	6,230	10,258	1,866	35.7	71,286	32.76	0.07	51	15	0.29	420	140	0.2
McMinn .....	480	15,004	7,261	7,803	12,718	2,346	31.4	104,174	33.91	0.08	80	22	0.27	393	131	0.2

# TABULATED RESULTS OF THE ENUMERATION.

5

TABLE I.—AREA, POPULATION, TILLED LAND, AND COTTON PRODUCTION—Continued.

Counties.	Land area.	POPULATION.						TILLED LAND.		COTTON PRODUCTION.						Cotton acreage per square mile.
		Total.	Male.	Female.	White.	Color'd.	Average per square mile.	Acres.	Percentage of area.	Percentage of tilled lands devoted to cotton.	Acres.	Bales.	Average per acre.			
													Bale.	Seed-cotton.	Lint.	
CUMBERLAND TABLE-LAND, ETC.—continued.																
b. Valley—continued.																
	Sq. mls.													Lbs.	Lbs.	
Meigs .....	300	7, 117	3, 584	3, 533	0, 303	814	23.7	49, 124	25. 59	0. 07	36	14	0. 39	555	185	0. 1
Loudon .....	230	9, 148	4, 504	4, 584	7, 382	1, 766	30. 8	68, 523	46. 55	0. 01	8	4	0. 50	711	237	.....
Roane .....	450	15, 237	7, 049	7, 588	13, 310	1, 927	33. 9	72, 596	25. 21	0. 05	35	18	0. 51	732	244	0. 1
Knox .....	500	30, 124	19, 099	20, 025	31, 880	7, 244	78. 2	154, 188	43. 18	0. 01	11	7	0. 64	906	302	.....
Jefferson .....	320	15, 846	7, 781	8, 065	13, 330	2, 507	49. 5	89, 704	43. 83	.....	.....	.....	.....	.....	.....	.....
Union .....	220	10, 260	5, 087	5, 173	10, 042	218	46. 6	54, 311	38. 57	.....	2	1	0. 50	711	237	.....
Grainger .....	320	12, 384	6, 043	6, 341	11, 555	820	38. 7	70, 999	37. 30	0. 08	59	36	0. 61	870	290	0. 2
Hamblen .....	150	10, 187	4, 900	5, 107	8, 481	1, 706	67. 9	45, 872	47. 78	0. 03	12	2	0. 17	237	79	0. 1
Hancock .....	340	9, 098	4, 466	4, 632	8, 616	482	26. 8	46, 847	21. 53	.....	.....	.....	.....	.....	.....	.....
Hawkins .....	570	20, 610	10, 066	10, 544	17, 956	2, 654	36. 2	124, 295	34. 07	.....	2	2	1. 00	1, 425	475	.....
Washington .....	350	16, 181	7, 921	8, 260	14, 604	1, 577	46. 2	109, 500	48. 88	.....	.....	.....	.....	.....	.....	.....
Sullivan .....	400	18, 321	9, 015	9, 306	17, 011	1, 310	45. 8	112, 567	43. 95	.....	.....	.....	.....	.....	.....	.....
Total .....	5, 170	215, 888	106, 000	109, 888	187, 933	27, 955	41. 7	1, 211, 911	36. 63	0. 02	206	121	0. 40	582	194	0. 1
c. Valley and Unaka.																
Polk .....	400	7, 269	3, 525	3, 744	6, 893	370	18. 2	36, 316	14. 19	0. 32	116	36	0. 31	441	147	0. 3
Monroe .....	500	14, 283	7, 080	7, 203	12, 901	1, 292	28. 6	94, 211	29. 44	0. 14	129	72	0. 56	795	265	0. 3
Blount .....	770	15, 985	8, 039	7, 946	14, 278	1, 712	20. 8	92, 860	18. 84	0. 21	198	70	0. 35	504	168	0. 3
Sevier .....	520	15, 541	7, 707	7, 834	14, 848	693	29. 9	79, 463	23. 88	0. 01	10	6	0. 60	855	285	.....
Cocke .....	540	14, 808	7, 278	7, 530	13, 361	1, 447	27. 4	70, 189	26. 31	0. 01	8	5	0. 62	891	297	.....
Greene .....	530	24, 005	11, 808	12, 197	21, 850	2, 155	45. 3	148, 665	43. 83	.....	8	1	0. 33	474	158	.....
Unicoi .....	480	3, 645	1, 826	1, 819	3, 526	119	7. 6	16, 269	5. 30	.....	.....	.....	.....	.....	.....	.....
Carter .....	340	10, 019	5, 013	5, 006	9, 385	634	29. 5	42, 970	19. 75	.....	.....	.....	.....	.....	.....	.....
Johnson .....	390	7, 766	3, 884	3, 882	7, 295	471	19. 9	36, 218	14. 51	.....	.....	.....	.....	.....	.....	.....
Total .....	4, 470	118, 321	56, 160	57, 161	104, 422	8, 899	25. 4	617, 161	21. 57	0. 08	464	190	0. 41	585	195	0. 1

## COTTON PRODUCTION IN TENNESSEE.

TABLE II.—ACREAGE AND PRODUCTION OF THE LEADING CROPS.

Counties.	COTTON.		INDIAN CORN.		OATS.		WHEAT.	
	Acres.	Bales.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
The State.....	722,562	330,621	2,904,873	62,764,429	468,566	4,722,100	1,190,563	7,331,353
ALLUVIAL PLAIN OF THE MISSISSIPPI RIVER.								
Lake.....	3,240	2,412	14,730	536,205	108	4,266	1,008	24,293
ALLUVIAL PLAIN OF THE MISSISSIPPI RIVER AND PLATEAU SLOPE OF WEST TENNESSEE.								
a. Alluvial plain and bluff.								
Dyer.....	14,637	8,564	27,820	900,726	1,001	37,371	11,820	101,523
Lauderdale.....	24,083	13,250	22,580	580,797	1,375	17,308	3,889	24,053
Tipton.....	38,429	21,415	32,379	762,731	2,431	34,096	7,303	50,137
Shelby.....	92,020	46,888	55,260	906,210	5,216	72,074	3,564	23,437
Obion.....	7,259	4,225	45,005	1,501,881	2,105	35,098	25,308	230,249
Total.....	177,028	93,842	183,044	4,742,345	13,088	196,637	52,004	436,293
b. Brown-loam table-lands, midland counties.								
Fayette.....	92,231	30,221	63,419	1,030,505	3,601	38,120	3,737	18,004
Hardeman.....	44,885	18,937	45,207	767,324	2,554	20,807	4,768	23,601
Haywood.....	49,919	23,092	39,878	730,040	2,076	29,200	5,326	30,278
Madison.....	45,825	19,257	46,885	906,255	3,157	31,542	9,023	50,918
Crockett.....	17,807	9,320	25,650	620,762	1,501	16,171	9,883	54,431
Gibson.....	36,820	19,272	57,838	1,440,633	3,378	44,282	26,016	102,477
Weakley.....	15,406	7,576	50,001	1,307,873	1,795	22,583	25,479	171,835
Total.....	302,893	136,675	328,878	6,819,301	19,022	202,813	84,822	510,934
c. Summit region of water-shed.								
Henry.....	13,186	5,516	51,852	1,128,660	3,171	35,407	20,853	124,537
Carroll.....	24,711	10,565	46,076	1,018,415	3,413	37,094	17,354	88,396
Henderson.....	22,344	9,419	37,734	862,249	4,543	42,176	9,701	46,941
McNairy.....	23,135	9,419	33,501	678,059	5,093	47,559	6,726	39,678
Total.....	83,376	34,859	169,163	3,687,383	16,220	162,836	54,724	290,532
WESTERN VALLEY OF TENNESSEE RIVER.								
Benton.....	4,923	1,801	24,738	562,354	2,368	26,832	4,600	19,785
Decatur.....	5,591	2,169	19,985	473,024	2,701	26,390	3,829	14,911
Hardin.....	12,859	5,345	30,909	799,730	3,387	35,020	5,445	29,248
Perry.....	452	196	15,007	423,461	1,461	23,874	3,113	16,651
Humphreys.....	155	90	26,387	826,941	1,988	24,521	5,420	25,371
Houston.....	8	4	8,974	231,311	841	13,846	1,864	9,092
Stewart.....	45	15	28,957	778,404	2,070	26,029	5,620	34,855
Total.....	24,033	9,620	155,007	4,096,134	14,816	177,721	29,897	149,383
THE HIGHLANDS, OR HIGHLAND RIM OF MIDDLE TENNESSEE.								
a. Western subdivision.								
Montgomery.....	2	2	40,892	1,236,561	7,263	86,026	17,122	148,534
Robertson.....			45,408	793,702	9,873	115,678	21,012	134,426
Cheatham.....	5	2	19,719	457,189	3,309	42,297	3,308	18,036
Dickson.....	31	13	26,351	616,422	4,200	50,735	8,518	45,318
Hickman.....	3,128	1,302	30,716	828,117	2,806	42,488	7,874	37,491
Lewis.....	229	102	5,272	114,010	339	4,808	1,189	4,824
Wayne.....	3,265	1,207	25,674	583,305	2,109	27,442	8,701	40,038
Lawrence.....	1,830	702	24,673	484,215	2,812	30,007	8,053	43,331
Total.....	8,490	3,330	224,045	5,063,521	32,801	399,571	70,777	471,008
b. Eastern subdivision.								
Macon.....	4	1	21,286	436,804	3,876	34,581	6,461	31,405
Clay.....	2	1	20,010	412,287	1,955	15,205	4,700	24,424
Overton.....	95	41	30,336	550,091	4,192	32,953	9,609	40,015
Jackson.....	56	28	27,448	683,019	2,508	28,714	6,825	40,204
Putnam.....	14	4	25,510	511,616	2,319	24,190	8,726	42,033
De Kalb.....	26	12	31,004	863,207	2,275	21,202	13,410	75,803
White.....	338	139	34,639	637,143	2,775	24,811	11,354	44,653

# TABULATED RESULTS OF THE ENUMERATION.

7

TABLE II.—ACREAGE AND PRODUCTION OF THE LEADING CROPS—Continued.

Counties.	COTTON.		INDIAN CORN.		OATS.		WHEAT.	
	Acres.	Bales.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
THE HIGHLANDS, OR HIGHLAND RIM OF MIDDLE TENNESSEE—continued.								
b. Eastern subdivision—continued.								
Warren.....	206	96	36,456	670,848	5,612	51,013	15,888	60,163
Coffee.....	55	20	27,962	668,203	3,127	34,100	9,574	58,155
Franklin.....	414	171	41,560	745,293	5,959	71,980	20,178	135,816
Total.....	1,210	513	296,211	6,168,595	35,289	339,379	106,821	558,851
CENTRAL BASIN.								
Giles.....	81,416	13,802	67,768	1,545,605	2,592	33,289	30,705	190,205
Lincoln.....	8,868	3,486	57,460	1,252,915	2,993	37,309	37,279	275,453
Moore.....	20	7	14,389	327,956	1,050	14,739	8,659	66,866
Bedford.....	2,239	940	68,492	1,682,358	6,270	87,408	39,580	257,425
Marshall.....	4,697	1,721	47,927	1,176,536	4,675	50,567	30,484	172,584
Maury.....	21,748	8,012	85,496	2,177,071	6,068	91,452	43,510	271,592
Williamson.....	11,850	4,538	61,122	1,469,445	5,912	85,522	39,685	315,966
Rutherford.....	32,057	12,414	75,753	1,590,855	6,482	74,794	29,250	172,997
Cannon.....	77	35	27,812	821,012	1,952	22,802	12,991	94,150
Davidson.....	3,224	1,333	62,704	1,436,582	8,141	133,807	18,651	157,530
Wilson.....	3,191	1,272	68,468	1,806,262	9,978	132,506	82,983	188,540
Smith.....			37,106	1,071,050	3,724	47,240	17,045	104,945
Sumner.....	732	317	40,245	917,940	9,188	95,081	20,445	140,895
Trondale.....	1	1	15,873	390,884	2,297	26,197	6,629	37,284
Total.....	120,729	48,778	729,225	17,641,971	71,322	941,713	368,595	2,446,432
CUMBERLAND TABLE-LAND.								
Fentress.....	6	2	14,591	210,416	2,482	15,524	2,705	11,092
Scott.....	3	2	12,686	185,046	3,606	23,060	447	2,297
Morgan.....	4	1	7,889	115,327	2,660	19,490	666	2,832
Cumberland.....			8,452	127,636	1,366	10,826	517	2,797
Van Buren.....	88	20	7,771	139,070	764	6,008	2,954	13,007
Grundy.....	32	21	6,864	114,758	889	8,507	1,753	7,855
Total.....	133	55	57,653	892,853	11,767	83,415	9,042	39,880
CUMBERLAND TABLE-LAND, VALLEY OF EAST TENNESSEE, AND UNAKA MOUNTAIN REGION.								
a. Table-land and valley.								
Marion.....	89	35	21,985	474,115	4,240	54,532	2,834	18,275
Sequitachio.....			8,267	145,532	709	6,337	1,068	6,735
Bledsoe.....			17,474	342,240	2,748	21,282	3,546	18,106
Hamilton.....	486	143	23,337	461,070	4,771	45,378	7,618	45,925
Rhea.....	9	4	16,453	362,801	3,848	38,050	4,764	31,290
Anderson.....	60	38	21,047	399,958	10,230	86,198	7,343	44,609
Campbell.....	4	1	22,138	341,945	8,100	68,334	4,518	25,540
Clatsborne.....	13	5	28,475	496,262	9,130	74,921	9,128	44,192
Total.....	661	226	159,176	2,908,923	43,782	390,182	40,819	234,681
b. Valley.								
James.....			14,413	223,701	2,816	15,148	6,638	34,657
Bradley.....	51	15	23,794	337,440	4,652	25,672	16,608	88,961
McMinn.....	80	22	35,313	480,898	9,865	78,372	20,296	119,873
Meigs.....	36	14	21,812	444,103	5,267	45,124	8,141	47,797
London.....	8	4	22,512	319,288	10,037	91,298	14,490	90,555
Roane.....	35	18	33,261	697,787	13,805	130,821	10,416	54,276
Knox.....	11	7	44,129	752,559	23,068	228,766	34,417	227,705
Jefferson.....			29,317	506,592	9,448	83,035	21,261	125,849
Union.....	2	1	19,844	319,702	7,524	62,263	8,015	39,298
Gwininger.....	59	36	25,832	356,128	10,568	83,078	12,895	61,563
Hambleton.....	12	2	16,143	281,184	6,731	51,270	11,085	66,057
Hancock.....			17,132	292,195	5,678	41,625	6,162	32,189
Hawkins.....	2	2	35,791	706,899	12,688	117,578	20,143	115,636
Washington.....			20,154	407,633	11,394	104,579	23,740	153,204
Sullivan.....			25,477	550,374	13,473	111,662	21,830	131,319
Total.....	296	121	384,924	6,026,484	140,514	1,275,281	280,037	1,388,849

## COTTON PRODUCTION IN TENNESSEE.

TABLE II.—ACREAGE AND PRODUCTION OF THE LEADING CROPS—Continued.

Counties.	COTTON.		INDIAN CORN.		OATS.		WHEAT.	
	Acres.	Bales.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
CUMBERLAND TABLE-LAND, VALLEY OF EAST TENNESSEE, AND UNAKA MOUNTAIN REGION—continued.								
<i>c. Valley and Unaka.</i>								
Polk .....	110	36	16,009	230,224	1,827	10,505	7,133	37,126
Monroe .....	129	72	33,928	566,356	10,116	80,793	10,773	114,884
Blount .....	198	70	31,686	450,011	12,888	95,367	20,588	110,106
Sevier .....	10	6	27,761	403,885	5,923	53,274	17,450	80,460
Cocke .....	8	5	28,368	553,567	5,767	50,105	16,060	94,793
Greene .....	3	1	39,464	719,465	10,507	139,134	30,259	237,302
Unicoi .....			5,049	81,852	2,309	22,501	1,840	9,365
Carter .....			12,403	243,906	5,046	51,141	8,226	55,150
Johnson .....			7,555	147,388	3,864	39,496	4,488	31,023
Total .....	464	190	202,217	3,495,654	68,867	542,376	136,417	779,367

---

PART I.

---

PHYSICO-GEOGRAPHICAL AND AGRICULTURAL FEATURES

OF THE

STATE OF TENNESSEE.






















---

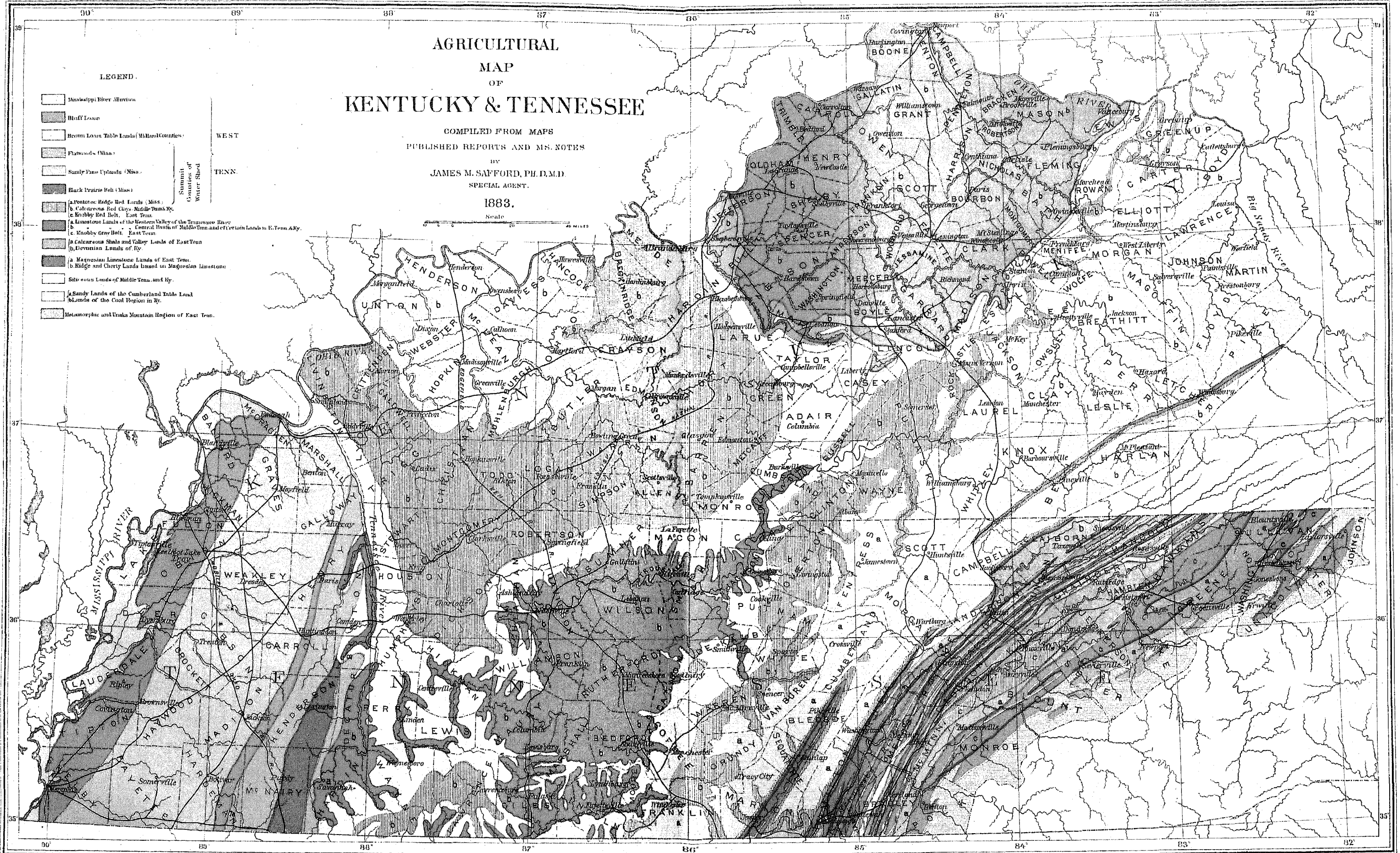


COMPILED FROM MAPS  
PUBLISHED REPORTS AND MS. NOTES  
BY  
JAMES M. SAFFORD, PH.D., M.D.  
SPECIAL AGENT.

1883.

Scale

	Mississippi River Alluvium	Summit Counties of Winter Shad	WEST	
	Bluff Loam			
	Brown Loam Table Lands (Midland Counties)			
	Flatwoods (Miss.)			
	Sandy Pine Uplands (Miss.)			
	Black Prairie Belt (Miss.)			
	a. Pontotoc Ridge Red Lands (Miss.)			TENN.
	b. Calcareous Red Clays Middle Tenn. Ky.			
	c. Knobby Red Belt, East Tenn.			
	a. Limestone Lands of the Western Valley of the Tennessee River			
	b. General Basins of Middle-Tenn. and certain Lands in E. Tenn. & Ky.			
	c. Knobby Gray Belt, East Tenn.			
	a. Calcareous Shale and Valley Lands of East-Tenn.			
	b. Devonian Lands of Ky.			
	a. Magnesian Limestone Lands of East Tenn.			
	b. Ridge and Cherty Lands based on Magnesian Limestone			
	Siltaceous Lands of Middle Tenn. and Ky.			
	a. Sandy Lands of the Cumberland Table Land			
	b. Lands of the Coal Region in Ky.			
	Metamorphic and Unksa Mountain Region of East Tenn.			



# OUTLINES OF THE PHYSICAL GEOGRAPHY

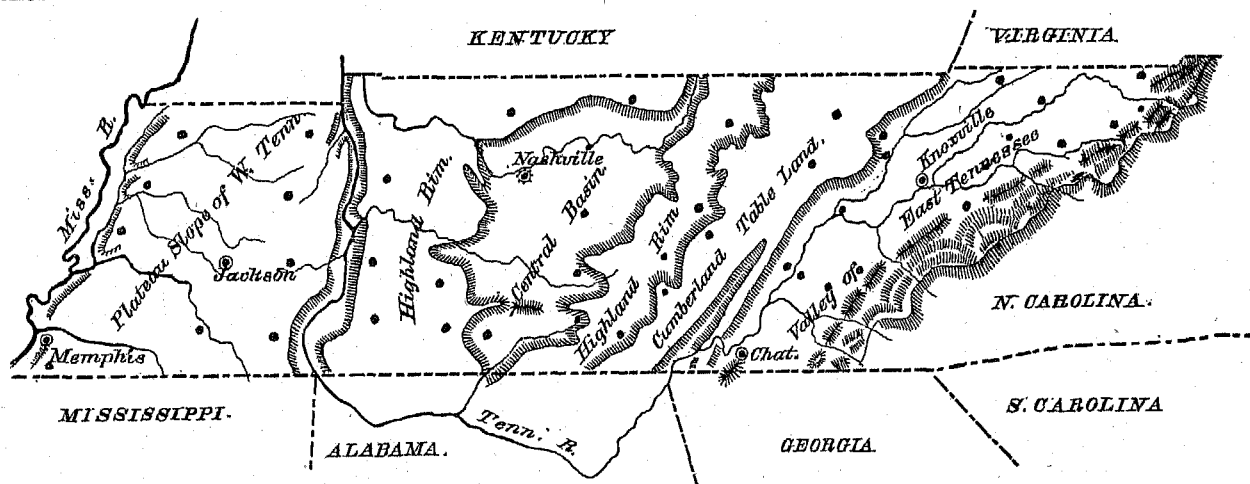
## OF THE

### STATE OF TENNESSEE.

The southern boundary of Tennessee coincides mostly with the parallel of latitude  $35^{\circ}$  north; its northern limit is a broken line lying between the parallels of  $36^{\circ} 29'$  and  $36^{\circ} 41'$ . In general outline the state has approximately the figure of a long rhomboid. Its mean length from east to west is about 385 miles, while its mean breadth cannot be much over 109 miles. Its land area is estimated to be 41,750 square miles; its water surface, 300 square miles.

**VARIETY IN NATURAL FEATURES.**—The length of the state, and the fact that it reaches, in its ribbon-like form, from the crest of a great mountain range on the east to the very low alluvial plain of the Mississippi on the west, through a varied territory, gives to Tennessee its most prominent characteristic, to wit, *great variety*. This is seen in its topography, geology, soil, climate, agriculture, and we may say in the character and habits of its population. As I have said elsewhere, (a) nearly all the important physical and geological features of the states around it are represented more or less (grouped as if for contrast) within its borders. Tennessee has, for example, on the one hand, some of the greatest mountain ridges of the Appalachians, with their "bald" summits and ancient rocks; on the other, the low land, cypress swamps, and alluvial beds of the Mississippi river. It has also well represented the singular parallel valleys and ridges of middle Virginia, the highlands, the "barrens", and the rich limestone lands of Kentucky, and the orange-colored sand-hills, the Cretaceous beds, and cotton soils of northern Mississippi. The same variety and contrasts exist in the matter of climate, especially as to summer temperatures.

**GENERAL TOPOGRAPHY AND ELEVATION.**—To aid in understanding the topography of the state it will be well to assume and have in mind a great horizontal plane, having an elevation of 900 feet above the sea, with which to compare the *general surface*. Throwing out of view for the moment some of the local geographical features, that is to say, the mountain ranges of the eastern portion and the basins and valleys of the western, the general surface coincides more or less with this plane. I say more or less, for the surface is in a degree a warped one, coinciding at very many points with the plane, but at others either rising above or sinking below it. Reference may here be made to the diagram below, which is intended to show the great natural divisions of the state, there being eight of them:



The following divisions are not named in the diagram: The *Unaka Mountain region*, in the extreme eastern part of the state; the *Western Valley*, through which the Tennessee river flows northerly into Kentucky; and the *Mississippi Bottom region*, in the extreme western part of the state.

The parts of the state approximately coinciding with our assumed plane of 900 feet elevation, or at least directly referable to it, are the great divisions named: the *plateau slope of West Tennessee*, the *highland rim of Middle Tennessee*, and the *valley of East Tennessee*.

The valley of East Tennessee is in its upper or northern part a few hundred feet above the plane, while in its central and southern parts it at first coincides and then very gradually falls below it. The highlands of Middle Tennessee in some counties, as in Lawrence and Wayne, present a flat surface 100 feet higher than our assumed reference plane, while in Montgomery and adjoining counties the corresponding highlands are considerably lower. The "ridge" in West Tennessee dividing the waters of the Tennessee and the Mississippi rivers, and including the summit-line of the great plateau slope, must at some points be nearly, if not quite, as high as the plane. Westward, however, the general surface sloping off toward the Mississippi falls considerably below, and may be regarded as terminating at an average elevation of not far from 400 feet along the edge of the bluff escarpment which faces the alluvial plane of the great river.

Upon the surface, as described, rest the mountains of the state, the most important being the great ranges of the Unaka region and the Cumberland table-land. Cut out of it and below it are the central basin of Middle Tennessee, the western valley of the Tennessee river, and the Mississippi bottom region.

Politically, the state is divided into three large divisions, namely, West Tennessee, Middle Tennessee, and East Tennessee. The first embraces all the counties between the Mississippi and Tennessee rivers, including the whole of Hardin county, altogether less than one-third of the state; the second the counties between the Tennessee river and a line approximately dividing longitudinally the Cumberland table-land, the largest division; and the third all the remaining counties in the eastern end of the state.

CLIMATE.—As already stated, in climate, as in other natural features, the state presents a marked variety. This is especially true of summer temperatures. The valley lands of upper East Tennessee have the summers of Ohio and New Jersey; the lowlands of Middle Tennessee have the summers of the northern part of Georgia; while West Tennessee is warmed by the summer of the central parts of Georgia and South Carolina. And further, there is, as will be seen hereafter, an extended line of high points on the eastern border of the state which have the cool breezes of a Canadian summer, and are, to some extent, clothed with a Canadian flora.

The climate of the state, exclusive of its mountains, is in general midway in character between that of a temperate and that of a subtropical region, or rather it combines the milder features of the two. In common with a large part of the valley of the Mississippi, the climate is subject to comparatively great extremes; yet these extremes never reach the excessive cold of the northern states or the highest temperature of the tropics.

Herbage is often green throughout the year, and cattle can generally graze, with but little interruption from cold or snow, during all the months of winter. Many shrubs which in states farther north lose their leaves during the winter, here not unfrequently retain them the year round. The daily changes of temperature are considerable, and, in common with a large area of the Mississippi valley, the state has a full share of humidity and sufficient rains. It is a part of the region of which it is said "cotton, Indian corn, and the cane find their natural climate here, but not elsewhere in any considerable degree beyond the tropics".

The annual mean temperature along a parallel running longitudinally through the middle of the state is, according to the best observations and estimates, about 60.5° for West Tennessee, 58.5° for Middle Tennessee on the meridian of Nashville, and 57.5° for the valley of East Tennessee, the range being 3°. For the annual means of parts of West and Middle Tennessee near the northern boundary of the state one degree may be subtracted from each of the above numbers respectively, and for parts near the southern boundary one degree added. In East Tennessee two degrees must be added and subtracted respectively for the northern and southern means. These approximations are the best that can be made at present. In making them, the temperatures of the mountain divisions, namely, the Cumberland table-land and the Unaka region, have not been considered.

The length of the period between the last killing frost of spring and the first killing frost of autumn is to the agriculturist an important element of climate. It is the measure of the growing season, at least so far as the cotton-plant is concerned. Not including the mountains, the average time for the last killing frost of spring is the middle of April in the northern counties of the state, excepting in those of upper East Tennessee, where it occurs a few days later. In the southern part of the state it is a week sooner. The average time of the first killing frost of autumn in the northern counties is the middle of October. It occurs a few days earlier in upper East Tennessee, and a week later in the southern counties of the state. The number of days between these frosts, that of spring and that of autumn, averages 189 for the northern part of the state and 203 for the southern. Frosts of course may occur respectively before or after the times specified, but the probabilities are against it. Early frosts begin to be a source of apprehension before the last of September, especially in the more northern portions of the state, and the cotton crop often suffers more or less from them.

The latitude of Tennessee is such that a fall of two degrees of temperature in the northern part of the state might cause a killing frost, resulting in the destruction of the cotton-plants, while the same fall in the southern part would leave them intact. The length of the growing season for cotton is, at the best, short enough in the southern part of the state, and where so slight a change of temperature produces such results we can readily see how, in the



northern part, it may be generally too short for full crops, which in reality it is. It amounts nearly to the same thing to say that the margin of the cotton-growing section of the country runs through Tennessee.

In an inspection of the map showing percentage of aggregate areas in cotton, as compared with the entire area of any given region, it is seen that the counties in Tennessee which plant and produce the most cotton are strikingly the most southerly ones, and that from these the production decreases almost uniformly as we go north. This is especially so in West Tennessee. Now, in explanation of this, in great part at least, it is to be noted that the isotherms, or lines of equal temperature, for spring and fall extend west-northwest through the state, say parallel with a line running through Chattanooga and Trenton or thereabout. This shows the southwestern corner to be the warmest, and here is our greatest center of cotton culture. The greater warmth stimulates the cotton, and by throwing back the killing frosts increases the length of the growing season. The soils have their influence, but that they are not dominant in this distribution of percentage culture is shown by the fact that as we go north the decrease occurs, though the soils and elevation remain essentially the same. It is also noteworthy that as we go eastward from each of the two centers of cotton culture (the southwesterly corner of the state and the southern part of the central basin) the percentage of cotton culture rapidly decreases. The temperature and higher elevation obviously have much to do with this decrease.

The rainfall for seven years (1873-1879) was: at Memphis, 54.40 inches; at Nashville, 51.98 inches; and at Knoxville, 54.52 inches, giving a mean of 53.60 inches. Our data indicate that we have the least rain in autumn and the most in winter and spring, yet so distributed through the months as to prevent any marked distinction into wet and dry seasons. The most favorable seasons are those in which the rainfall is about a mean, provided it is suitably distributed among the months. It is more frequently too dry than too wet during the summer.

THE ROCKS AND SOILS IN GENERAL.—The varied character of the natural features of Tennessee, both geological and agricultural, have already been referred to. As to the latter, this variety is marked, and will appear farther on. From the North Carolina boundary to a line nearly coincident with that part of the Tennessee river which flows northwestward across the state from Mississippi to Kentucky the strata underlying the soils, excepting the limited river bottoms, are everywhere *hard rocks* of many varieties: gneissoid and half metamorphic conglomerates, slates, and sandstones of the mountains to begin with; then calcareous shales, dolomites, and limestones of the valleys and calcareo-siliceous rocks of certain flat highlands. Much the greater part of the state, including the whole of Middle and East Tennessee, is made up of these hard rocks. Passing the line referred to, a wonderful change takes place. The hard rocks suddenly disappear, beveled off as if it was once a coast-line washed by the waves, and abutting against their beveled edges begin strata, little indurated, of clays, sands, and other material, which spread over nearly the whole of West Tennessee. The latter strata, which we call, by way of contrast, *soft rocks*, are of much later geological age than the former, and give to West Tennessee characteristic features.

The strata of the state, be they soft or hard rocks, are approximately horizontal in position, excepting those of the valley of East Tennessee and the Unaka mountains, which are generally tilted, dipping to the southwest, often at a high angle, with their edges outcropping at the surface in long lines running northeast and southwest. The position of the strata has much to do with the topography of a country and with the extent and shape of its agricultural areas. Owing to the outcropping of the tilted strata of East Tennessee in long lines, it is a *fluted* country, made up of closely packed long and narrow valleys and ridges, all running in straight courses to the northeast and southwest. Its best soils and agricultural areas occur, therefore, in long, narrow strips or belts separated by ridges. No such parallelism of valley and ridge is to be seen in the other parts of the state.

The soils are classified for the most part by the rocks, and it is the decay and disintegration of the latter which supply the inorganic materials. In Middle and East Tennessee, where, with unimportant exceptions, superficial drift formations are absent, the connection between the limestones, sandstones, shales, etc., and the overlying soils is very apparent. There being many kinds of rocks, there will be many kinds of soil, and the most important in the divisions just named are the calcareous soils; that is, those of the limestones, dolomites, and calcareous shales. With the exception of the limited alluvial areas of certain streams the cotton of Middle and East Tennessee is produced, substantially, on calcareous soils.

The most important cotton soils of Middle Tennessee belong to two horizons of the Trenton limestone period, namely, the upper part of the Hudson river (Nashville) rocks, and certain beds of the lower part (the Central or Murfreesborough limestone).

In East Tennessee the little cotton cultivated is mostly found on the calcareous shale and dolomites of the Quebec (Knox) division of the Canadian period.

In West Tennessee the soils are chiefly based on sands, sandy clays, loess (calcareo-siliceous earths), and alluvial deposits. They are for the most part mellow, warm, and well adapted to the growth of corn, cotton, and tobacco.

THE NATURAL DIVISIONS OF THE STATE.—These have already been referred to, and are here briefly characterized. They are well defined, and will be taken as a basis in the arrangement of the matter of this report.

1. *The Mississippi bottom region*, embracing the Tennessee portion of the great alluvial and low plain in which the Mississippi river has its tortuous bed; area, approximately, 900 square miles; average elevation above tide, about 260 feet.

2. *The upland or plateau slope of West Tennessee*, including the entire area between the low bottoms of the Mississippi and the Tennessee valley next mentioned. It begins with the line of bold bluffs or escarpments overlooking the bottoms, and gradually ascends eastward, embracing the ridge dividing the waters of the Mississippi and the Tennessee rivers, respectively, and the highlands immediately beyond. Average elevation, 500 feet; area, 8,850 square miles, equal to one-fifth of the state.

3. *The western valley of the Tennessee river*, a comparatively narrow, broken area, through which the Tennessee river flows in its direct northward course from the state of Mississippi to Kentucky. The valley is crowded between the breaks and slopes of two plateaus, the one just mentioned and the Highland Rim, lying next to the east. Average elevation, 360 feet; area, 1,200 square miles.

4. *The highland rim, or rim highlands* of Middle Tennessee, encircling, terrace-like, a basin of rich lowlands in the very center of the state. From the valley last mentioned eastward to the western foot of the Cumberland table-land, a distance of more than 100 miles, there lies a nearly square portion of the state. This area is a plateau having an average elevation of 1,000 feet above tide, out of the middle of which has been excavated a basin, named below the *central basin*. The part left intact is the rim, a complete circle of flat highlands, with an area of 9,320 square miles, nearly two-ninths of the state.

5. *The central basin*.—The basin surrounded by the rim is thus designated. It is the central part of Tennessee, supplies the site for its capital, and is the garden of the state. It is oval in form, with longer and shorter diameters, respectively, of about 120 and 55 miles. Average elevation above the sea, 600 feet; area, 5,450 square miles, more than one-eighth of the state.

6. *The Cumberland table-land, usually known as Cumberland mountain*, is a plateau with broad and generally level top, and stands in bold relief above the lowlands on each side. It is capped with sandstone, and is the Tennessee coal-field. Elevation, 2,000 feet; area, 5,100 square miles.

7. *The valley of East Tennessee*.—The great valley of which Knoxville is the metropolis is a fluted region or succession of parallel minor valleys and ridges, and is one of the most beautiful and populous portions of Tennessee. It extends obliquely through the state, and is bounded on the west and northwest by the eastern escarpment of the Cumberland table-land, and on the southeast by the Unaka chain. Average elevation, 1,000 feet; area, 9,200 square miles, exceeding one-fifth of the surface of the state.

8. *The Unaka region* comprises an area of bold mountain ridges, more or less parallel, having a general northeast and southwest trend and inclosing many valleys and coves, and is the eastern mountain border of the state. The line separating Tennessee from North Carolina is, for the most part, the crest of the most easterly and highest ridge. Average elevation of summit, 5,000 feet above the sea; area, excluding the interlocked valleys and coves, about 2,000 square miles.

#### THE MISSISSIPPI BOTTOM REGION.

That portion of the great alluvial plain of the Mississippi river pertaining to Tennessee, or, I might say, to Kentucky and Tennessee, is comparatively small. The course of the river is such on the western border of these states as to divide the plain very unequally, throwing much the greater part, popularly known as the Saint Francis bottom, into Missouri and Arkansas, and leaving a narrow interrupted strip in Kentucky and Tennessee.

In the latter states, as indeed farther south, the alluvial plain is bounded on the east by a sharply defined line of bold bluffs, or a bluff escarpment, the edge of the flat uplands which extend off eastward. This bluff escarpment, or edge, reaches in a nearly straight line from Kentucky, through Tennessee, to Mississippi. We shall call it the bluff. The strip of the great plain belonging to Kentucky and Tennessee is interrupted and cut into a number of sections by the repeated bending in of the river to the bluff. The river thus strikes the uplands at the following points: Columbus and Hickman, in Kentucky, and Fulton, Randolph, and Memphis, in Tennessee. (a) The largest of the sections, and the most important so far as Tennessee is concerned, lies between Hickman and Fulton. This includes Madrid bend and an area in Kentucky south of Hickman, but the main part is in Tennessee. The next most important section stretches from Randolph to Memphis. The section between Randolph and Fulton is inconsiderable, the points being but a few miles apart. Below Memphis begins the large division of the great plain known in Mississippi as the "Yazoo bottom". This belongs to the latter state, excepting the extreme northern end, which is in Tennessee. It is to be added that there is a number of cultivated islands in the Mississippi river which must be included in the Kentucky and Tennessee portion of the plain.

The alluvial plain in Tennessee has about the same general features as elsewhere. It is, or has been, forest-covered, much of it heavily so, and many parts are subject to overflow. It has its bayous, lakes, and cypress swamps. The highest land, and that chiefly under cultivation, often called "front-land", is generally a raised, wide bank or belt bordering the river, and formed by the deposition of alluvial matter in great overflows of the past, the overflowing water having lost the bulk of its earthy load as it first escaped from the deep and swift channel

a Formerly the river washed the uplands at another point, "Old river," as now known by some, in the southern part of Tipton county. The four points, Fulton, Randolph, "Old river," and Memphis, were once known as the four "Chickasaw bluffs", Fulton being the first and Memphis the fourth.

current. Going from the river and this higher land, the surface generally slopes off into lower "back-lands", with "buckshot" clays and soils, finally ending, it may be, in a lake or a cypress swamp. Such at least are the typical features. This division embraces the whole of Lake county, about one-third each of Dyer and Lauderdale counties, and a fraction each of Tipton and Shelby. It also embraces Reelfoot lake and limited lands in Obion county. The entire area has been estimated to be 900 square miles, but this is probably an overestimate. The blue tint on the colored map indicates this division. The cultivated land forms for the most part an interrupted belt along the Mississippi river, and has a width ranging from the fraction of a mile to two miles or more. The greatest single body of such land lies in the middle and northern parts of Lake county, where the proportion in cultivation is estimated to be at least two-thirds of the area. In the southern part of Lake the proportion is not more than one-fourth; half of which is along the river. There is much timber land, and large bodies are subject to overflow. South of Lake county the proportion of land in cultivation is still less. In Dyer county the cleared land is a more or less broken strip bordering the river from half a mile to 2 miles wide, with an average width of 1 mile. There are, however, in this county many thousand acres fit for farming purposes as yet uncleared.

The following extracts from letters of correspondents refer to the Mississippi bottom region in Lauderdale county. The characteristics given, however, may in the main be taken as illustrative of the general features of the entire division in Tennessee. Mr. J. L. Lea, of Fulton, writes:

A slip of cultivated land runs along the Mississippi river, and but little lies back from the river. The best and highest land is always along the river. The bottom about the mouth of the Hatchie is small. Hatchie bottom proper is about 1 mile or 2 miles wide, and has a slough of cypress timber and some tupelo-gum swamps. There is not much cultivation until you strike the second bottom along the foot of the hills.

The main Mississippi bottom region of this county is the area lying between Coal creek, Forked Deer river, and Mississippi river, an area, say, 8 to 10 miles wide and 15 or 20 long, and including 100,000 acres. I believe that in extreme high water every spot of this has been covered, unless it be certain Indian mounds.

There are farms in the bottom bordering the Mississippi river, but not along Coal creek or Forked Deer river. It is 3 or 4 miles above the mouth of Coal creek before the farms begin. I suppose 6,000 or 8,000 acres would cover all the cultivated land of the bottom. Cypress swamps exist all through the area, say 25 per cent. of the whole. I do not know that there are any tupelo-gum swamps in it; do not remember to have seen or heard of any. This bottom would be a magnificent tract of land were it not for the interference of the water. There is a disposition to bring it into use notwithstanding, and some persons are clearing more deeply overflowed lands than had been thought available. I have cleared some land having 10 or 12 feet overflow and make corn on it almost every year. I plant in June, and secure 40 or 50 bushels of hard corn per acre. It is safer from overflow in summer than any creek or river bottom in hilly or mountainous countries. I suppose 25 per cent. of this bottom overflows 2 feet or less, 25 per cent. 5 feet or less, 25 per cent. 10 feet deep or less, and the balance is made up of lakes and sloughs. Two-thirds of the cultivated land is in cotton. There is no road along the bank of the Mississippi river across the mouth of Coal creek, and none, I think, across the mouth of old Forked Deer river, except perhaps in low water. Roads are found in all the farming areas. These statements are necessarily imperfect, and in some points may be incorrect.

Mr. J. C. Marley, of Ripley, writes:

According to the best statements I can make, there are about 100,000 acres of land between the bluff and the Mississippi river termed bottom or overflowed land. This is equal to about one-third of the area of the county. Of this there is in cultivation about 8,000 acres, of which about 5,000 are in cotton. Most of the cultivated land is near the river, and lies in a broken belt along its banks. There are a few patches of cultivated land out back from the river; and other land is also susceptible of improvement, some near the bluff or highlands. Very little of this bottom land is entirely above extreme high water, but there is much of it on which the overflow is slight. I would estimate that on one-third of the land the water never gets more than 2 feet deep, and that on one-half it never exceeds 4 feet. It is thought by our best farmers on the river that a slight overflow is advantageous. The difficulty in cultivating land subjected to deep overflows is that the fences float away. There is no land in our county that produces so well as this bottom. A friend of mine near Hale's Point tells me that he has for the last eight years cultivated about 50 acres in cotton, and that it averaged each year 500 pounds of lint to the acre.

The bottom in Tipton is estimated to average 4 miles in width. Farms occur at intervals all along the river, but none back until the bluff is reached. This country includes also four islands, containing in the aggregate 17,000 acres, 2,500 of which are under cultivation. The bottom continues into Shelby, with the same general features as heretofore described.

The soils may be grouped into two classes, the loams and the "buckshot" clays. The loams prevail, and are dark and exceedingly fertile, at times clayey and stiff, and then sandy and mellow, sometimes becoming too sandy. The buckshot soils are subordinate. Mr. Lea says:

The term "buckshot" is applied to certain stiff black soils which break up into small fragments when cultivated. These soils are not uniform in kind, and vary a little in color and in other characteristics. They are not generally found in very large bodies, as the overflows deposit sandy and loamy lighter soils at intervals upon them.

These buckshot soils are derived from a stratum of dark clay which extends throughout the bottom, and upon which, as a floor, the high waters deposit their alluvial load.

No analyses have been made of samples of the soils of this division taken from Tennessee. Analyses, however, have been made of the corresponding soils in other parts of the Mississippi plain which fairly represent the composition of those of Tennessee.

## COTTON PRODUCTION IN TENNESSEE.

We select as typical the following analyses, the soil being found in the Yazoo bottom in Mississippi. They are extracted from Professor E. W. Hilgard's report on the cotton production of Mississippi:

No. 354. *Dark-colored, rather light loam*, from Tallahatchie county, Mississippi, a good representative of the "front-land" soils.

No. 376. *Grayish, rather sandy soil*, from Sunflower county, Mississippi. This land is reported as not much esteemed by farmers.

No. 394. *Stiff, pale gray loam*, with yellowish or orange flecks, so that when worked up the soil is somewhat yellow. This soil is from Issaquena county, Mississippi.

No. 396. *Light "buckshot" clay*, taken from the edge of a depression or pond, Coahoma county, Mississippi.

No. 390. *"Buckshot" soil* of Deer Creek back-land, Issaquena county, Mississippi. It is a stiff, dark-colored clay soil, traversed by numerous cracks, and mottled with spots of ferruginous matter. Upon drying, it breaks up into little angular fragments. It is exceedingly fertile.

## Mississippi river bottom soils, Mississippi.

	TALLAHATCHIE COUNTY.	SUNFLOWER COUNTY.	ISSAQUENA COUNTY.	COAHOMA COUNTY.	ISSAQUENA COUNTY.
	Tallahatchie bottom soil.	Indian Bayou front-land soil.	Sunflower River front-land soil.	Light colored buckshot clay.	Deer Creek buckshot soil.
	No. 354.	No. 376.	No. 394.	No. 396.	No. 390.
Insoluble matter.....	87.146 } 91.944	87.898 } 91.934	71.164 } 84.070	75.513 } 86.408	51.068 } 71.787
Soluble silica.....	4.792 }	4.036 }	12.500 }	10.895 }	20.704 }
Potash.....	0.301	0.226	0.401	0.606	1.104
Soda.....	0.084	0.116	0.191	0.140	0.325
Lime.....	0.301	0.153	0.400	0.380	1.340
Magnesia.....	0.385	0.256	0.600	0.072	1.065
Brown oxide of manganese.....	0.158	0.048	0.011	0.133	0.110
Peroxide of iron.....	2.120	1.848	3.845	2.804	5.818
Alumina.....	2.151	2.565	6.889	4.457	10.530
Phosphoric acid.....	0.112	0.162	0.165	0.278	0.304
Sulphuric acid.....	0.605	0.042	0.016	0.007	0.024
Water and organic matter.....	2.644	3.013	2.748	4.401	7.300
Total.....	100.205	100.363	100.038	100.508	100.383
Hygroscopic moisture.....	4.79	4.07	7.39	6.04	14.81
absorbed at.....	22 C.°	14 C.°	15 C.°	12 C.°	15 C.°

In giving these analyses, Professor Hilgard makes the following remarks:

These soils are types of the prominent soil-varieties occurring equally on both sides of the Mississippi north of the mouth of Red river. Without entering into a detailed discussion of these soils in this place, it is important to call attention to the fact that in its store of plant-food of all kinds the "buckshot" soil stands pre-eminent above all the rest, and well justifies its reputation of being the most productive and durable soil of the great bottom. Unlike most other clay soils, it may be tilled at almost any time when the plow can be propelled through it, because, on drying, it crumbles spontaneously into a loose mass of better tilth than many an elaborately tilled upland soil. It is of such depth that the deepest tillage, even by the steam-plow, would not reach beyond the true soil material, and its high absorptive power secures crops against injury from drought. At the same time (owing doubtless to its being traversed by innumerable fine cracks and being underlaid by gravel and sand) it drains quite readily. In good seasons a large part of the cotton crop grown on this soil has often been left unpicked for want of labor after taking off from 1,500 to 1,800 pounds of seed-cotton to the acre. Two bales of lint per acre can undoubtedly be produced on such soils with fair culture and good seasons.

## THE UPLAND OR PLATEAU SLOPE OF WEST TENNESSEE.

This large and important division is pre-eminent the cotton region of the state. Leaving the great bottom at any point, we ascend the bluff to an average elevation of about 130 feet and find ourselves upon a flat and wide-spreading plateau. From the bluff the plateau extends eastward, gradually rising to the Tennessee ridge, by which name the high belt of country which lies on both sides of the actual summit of the water-shed dividing, respectively, the waters of the Mississippi and Tennessee rivers, and chiefly within the counties of Henry, Carroll, Henderson, and McNairy, has been designated. The plateau, or plateau slope, has from its western to its eastern limit a mean length of about 84 miles. Its form is nearly rhombic, and its area 8,850 square miles. It is a section of a greater plateau lying in Kentucky, Tennessee, and northern Mississippi, between the bottoms of the Mississippi river on the one hand and the valley of the Tennessee on the other, and embraces in its area the following counties and parts of counties: All of Weakley, Gibson, Carroll, Crockett, Haywood, Madison, Henderson, Fayette, and Hardeman; much the greater parts of Henry, McNairy, Shelby, Tipton, Lauderdale, and Obion, and smaller parts of Hardin, Decatur, Benton, and Dyer.

The division is well supplied with water-courses. The summit of the water-shed is so near the Tennessee river that much the longer slope is on the Mississippi side. On this side, therefore, the rivers are most characteristic. They are numerous and long for their water volume, and run in nearly parallel courses, from the Tennessee ridge northwestward, until they intersect or nearly reach the line of the bluff, when they turn southwestward through the bottoms of the Mississippi river. These rivers have sluggish currents, and usually a wide flat bottom on both sides, bearing a heavy forest growth, and are often swampy and subject to overflow. Back from the immediate bottoms the surface often rises in "second bottoms", supplying arable lands of good quality.

The following data indicate the general elevation of the plateau slope. The Tennessee ridge, or belt of highlands referred to, has in the southeastern part of the division, in McNairy and Henderson counties, an elevation above tide of from 500 to 600 feet. Some points exceed this, probably reaching as much as 800 feet. From Jackson northward the elevation ranges from 400 to 500 feet, and going toward Memphis the elevation falls considerably below 400 feet. The bluff has a mean elevation of about 400 feet. At Memphis its height is below the average both as to the sea and as to the Mississippi; at Randolph its height above both is an average. Passing northward, its elevation above tide becomes greater, but remains about the same as to the Mississippi.

We divide the plateau slope into three subdivisions, as follows:

1. *The bluff region.*
2. *The brown-loam table-lands.*
3. *The summit region of the water-shed.*

#### THE BLUFF REGION.

The bluff region (orange color on map) includes nearly the whole of Obion county and the larger parts of Dyer, Lauderdale, Tipton, and Shelby counties. It is a belt of country from 20 to 25 miles wide extending from Kentucky to the state of Mississippi, and lies east of and adjoining the Mississippi bottom. Its eastern limit is approximately coincident with that of the tier of counties mentioned. Its soil is a calcareo-siliceous loam, often called clay, based on yellowish-gray or often an ashen-colored loess, more or less calcareous. (a) The loess itself rests on a bed of gravel and orange sand, which sometimes appears at the surface, especially near the eastern margin of the belt, in washed places and road-cuts. The upland soil is the prevalent one, and varies in color from a gray or ashen to a brown or dark loam, is deep and mellow, in fine pulverulent condition, easily tilled, contains more calcareous matter than is ordinarily met with in the soils of this part of the state, and is altogether a superior upland soil. It is easily washed, and needs judicious tillage. It is remarkable for its forest growth. In some sections it supplies the largest trees to be found in the state, great "poplars" (tulip-trees), oaks, sweet gums, elms, hickories, walnuts, sassafras (growing up like great pine trees, with long trunks), beeches, and other trees reaching dimensions much above the average. In favorable seasons from 1,500 to 1,800 pounds of seed-cotton are often raised per acre upon the best of this land. Shelby, the most southerly county of the belt, produced in the main upon this soil in the census year more cotton than any other county of the state, besides making good crops of Indian corn and oats. Owing to long or improvident culture the soil in some sections is more or less exhausted. It and its substratum, however, are strong in the elements of fertility, so much so that, unless badly cut up by washes, it is susceptible, when impoverished, of great improvement, or even restoration.

In addition to the uplands, the second bottoms of the streams, both of creeks and rivers, supply a large aggregate of arable land of good quality, the soils being strong loams or mixed soils composed of ingredients from the loess and subjacent strata. And further, the alluvial dark bottom lands of the creeks, if escaping ordinary overflows, are often very fertile and durable. As a general thing, the bottoms of the rivers are clayey and cold, but they sometimes present areas prized for their fertility.

The following analyses are given of a representative soil and subsoil and loess of this region. The specimens were taken and averaged with care in accordance with directions given by Professor E. W. Hilgard:

No. 15. *Upland soil* from a poplar grove at Gill's station,  $2\frac{1}{2}$  miles east from Memphis, Shelby county. Depth, 6.2 inches; timber growth, chiefly "poplar" (tulip-tree), sweet gum, and hickory; also sugar maple, red, and other oaks, red-bud, and dogwood. The soil, after drying, has a light brownish-gray or ashen color.

No. 16. *Upland subsoil*, taken below the above soil. Its appearance, with the exception of a yellowish cast, does not differ very much from the soil.

These analyses have representative value, but it will require the analysis of many such specimens, selected from all the counties of the belt, to give true averages of the composition of this upland soil and of its most important varieties.

No. 17. *Loess* from the river bluff at Memphis, Shelby county, taken at 12 inches. This specimen was selected by J. G. Snedecor, esq., of Memphis.

a This formation, the loess, can be satisfactorily studied in the bluff at Memphis. All the material of the bluff here above high-water mark belongs to it. The cuts made for the streets and railroads expose it well. The gravel and sands underlying the loess at this point can only be seen at low water.



## COTTON PRODUCTION IN TENNESSEE.

*Lands of the bluff and loess region, Shelby county.*

	GILL'S STATION.		MEMPHIS BLUFF.	
	Upland soil.	Upland subsoil.	Loess.	
	No. 15.	No. 16.	No. 17.	
Insoluble matter.....	84.646 } 89.112	83.128 } 89.981	73.113 } 70.503	
Soluble silica .....	4.400 }	3.853 }	3.890 }	
Potash.....	0.392	0.399	0.433	
Soda.....	0.085	0.181	0.180	
Lime.....	0.248	0.243	3.967	
Magnesia.....	0.677	0.438	3.201	
Brown oxide of manganese.....	0.030	0.042	0.094	
Ferric oxide.....	2.416	3.004	4.087	
Alumina.....	2.333	5.026	3.102	
Phosphoric acid.....	0.083	0.064	0.319	
Sulphuric acid.....	0.080	0.010	0.000	
Carbonic acid.....			5.501	
Water and organic matter.....	4.159	2.620	1.730	
Total.....	99.555	99.608	99.027	
Hygroscopic moisture.....	5.00	6.31	4.07	
absorbed at.....	16 C. <sup>o</sup>	17 C. <sup>o</sup>	16 C. <sup>o</sup>	
Humus.....	1.062			
Inorganic matter.....	0.972			
Available silica.....	0.473			
Available phosphoric acid.....	0.049			

[The soil and subsoil from Gill's station, while having a fair amount of potash and lime, are deficient in phosphoric acid. More than one-half of the latter is in an available form in the soil, as shown in the humus determination. The loess, much less sandy than the other soil, is also richer in potash, and contains large percentages of lime and phosphoric acid, as well as of magnesia. Its organic matter is low.—R. H. L.]

The following abstracts from the reports of correspondents bear more or less upon the features of the subdivision in general, and will be in place here. The name and the county of the correspondent are given in each case: (a)

JOHN H. McDOWELL, OBION COUNTY: The kinds of soils cultivated in cotton are: (1) Light, easily tilled, easily drained blackish uplands, having very little sand and a clay subsoil; (2) black, loamy lowlands, with heavy gray and cold subsoils; (3) light-brown surface soil, with a yellow subsoil. The chief soil is the blackish level upland. It comprises one-fourth of the land in this region, and extends 12 miles north and south and 10 miles east and west, with the exception of the small intervening creek bottoms. The native growth is hickory, oak, ash, linden, sugar-maple, beech, gum, walnut, "poplar," box-elder, hornbeam, and others.

B. W. HERRING, OBION COUNTY: The soils put in cotton are: (1) That of the uplands, which is best and most used, light clay, mixed with some sand, ashen colored or gray; (2) waxy bottom lands. Three-fourths of the land is of the first kind. The growth is oak, hickory, poplar, ash, and walnut.

LOUIS M. WILLIAMS, DYER COUNTY: The soils are: (1) Rolling or hilly land, a clay loam with yellow clay subsoil; (2) valley and creek bottom, black loam land; (3) flat land, crawfishy or whitish-gray. The best is the clay loam, comprising about two-thirds of this region, and embracing all rolling land; its depth is from 6 to 24 inches, and it extends east 10 miles, west 8, north 4, and south 7 miles. The soil to the east becomes more sandy. The growth is principally poplar, intermixed with gum, white oak, maple, and sugar-tree. The subsoil is yellowish in most places, in others reddish and very tenacious. On being turned up to the sun and frost it pulverizes and becomes very fine, incorporating readily with the soil. It is impervious to water in many places. Underdraining remedies many evils to which our soil is subject. Rounded pebbles occur at a depth of from 16 to 18 feet; also sand and thin sand-rock at from 20 to 25 feet.

FRANK T. RICE, LAUDERDALE COUNTY: The soils used for cotton are: (1) Dark upland, much worn and turning rapidly to red clay; depth on the hills, 4 inches; (2) dark loam soil of Lagoon and Williams' creeks; (3) dark loam, occurring on the Hatchie river. The best is the hill or upland soil, covering three-fourths of this region, and extending 30 miles north, 40 south, 50 east, and 25 west. The growth is white, black, and red oaks, poplar, sweet and black gums, elm, maple, hickory, ash, dogwood, sassafras, and others. The subsoil is a tough red clay, baking hard when exposed. The soil is not very productive.

J. H. SHINAULT, TIPTON COUNTY: The soils cultivated in cotton are: (1) Black upland soil, lying mostly in patches of from 10 to 50 acres; (2) dark alluvial soil, lying near creeks and branches, of which there is but little; (3) heavy buckshot of mixed dark and light colors. The chief soil is the black upland, covering about half of the surface here, and extending north 10 miles, east 15, south 30, and west 8 miles. Thickness, 10 inches. There is now, however, a great difference in the productive qualities of this soil, some of it being worn out. The principal growth is oak, poplar, and gum, with ash, elm, and maple. The subsoil is a light mahogany, soft for subsoil, which becomes like the surface soil by cultivation; it is not entirely impervious to water when undisturbed, and is underlaid by red sand at 25 feet.

H. L. DOUGLASS, SHELBY COUNTY: Cotton is cultivated upon the following soils: (1) light gray, and (2) dark gray. The chief soil is the light gray, a fine silty loam, sometimes brownish, and from 3 to 8 inches thick. Cotton matures earlier upon it. This soil extends north 50 or 60 miles, west 6 or 8, south 20 or 25, and east 20 or 25 miles. The growth is white and red oaks, sweet and black gums, walnut, honey-locust, mulberry, and maple. The subsoil is a tough red or yellow clay, crumbling when exposed, underlaid by sand and blue clay at from 10 to 30 f

W. H. NELSON, SHELBY COUNTY: The cotton soils are: (1) a clay loam, and (2) alluvial bottom soil. The chief soil is the clay loam, which occurs over three-fourths of this region, and extends northward through two or more counties and southward into Mississippi, 8 miles west and 20 east. This soil is brown, becoming lighter after long cultivation; thickness, 5 inches. The growth is oak, hickory, "poplar," maple, gum, dogwood, elm, ash, walnut, beech, and cottonwood. The subsoil is a yellow brick clay about 25 feet in depth, without sand or gravel, except in some places along the brows of hills, not impervious to water, and contains hard, rounded pebbles and sand at 25 or 30 feet.

#### THE BROWN-LOAM TABLE-LANDS.

The region of the brown-loam table-lands (light orange color on map) constitutes the largest and most important agricultural subdivision of the plateau slope. These table-lands present a belt-like area, extending through the state, twice as broad as that of the bluff region, and embraces the following counties, which we may call the *midland counties* of the plateau slope: Fayette, Hardeman, Haywood, Madison, Crockett, Gibson, and Weakley, together with large parts of Carroll and Henry and small parts of other counties. Its area is about 4,450 square miles, or about half that of the entire plateau slope.

Of the counties mentioned, the first seven only are considered in the remarks immediately below, Carroll and Henry being included in the third subdivision and the fractional parts of the others in the first and third. The subdivision, as thus limited, supplies about five-twelfths of the entire cotton product of the state, besides being surpassed by only two sections in the yield, respectively, of Indian corn and tobacco (the central basin in corn and the western subdivision of the highland rim in tobacco, both sections of Middle Tennessee). On the map showing percentage of acres in cotton as compared with the whole number of acres in any given district it will be seen that the color area indicating the highest percentage lies, as already observed, in the southwestern corner of the state. This area is confined to the southern parts of the bluff region and the subdivision under consideration, and lies in the counties of Shelby, Tipton, Fayette, Haywood, Hardeman, and Madison, the first two being counties of the bluff region. From this, in every direction within the state, the relative proportion of cotton planted decreases, until, to the east only, we reach the central basin, in the southern part of which is a second but subordinate center of cotton culture.

The table-lands subdivision as shown upon the map, and including the counties and parts of counties first enumerated, is a plateau region of moderately rolling uplands cut into sections by the numerous rivers and their tributaries. The formation underlying the soils and subsoils is the orange sand of the drift. The orange, yellow, and sometimes gray sands of this formation are often seen in the railroad cuts, in gullies, and in bluffs on the rivers, at depths below the subsoil of from 3 to 10 feet or more. The soil of the uplands is, of course, the prevailing one. It is a brown, or, when moist, blackish, warm, siliceous loam, noted for its mellowness, and on slopes is easily washed, and therefore requires careful handling. The subsoil is reddish-brown and more clayey than the surface soil. The soil is well suited to the culture of cotton, especially in a region like that of West Tennessee, where the shortness of the growing season (the period between killing frosts) makes early maturity desirable. The same belt of country and soil extends far into Mississippi, where it contributes largely to the production of the best upland cotton in that state. The soil is tolerably uniform in character, though here and there sections occur which, by their more stunted natural growth, show them to be below the average fertility. (a) In many districts the soil has been more or less injured by bad or improvident culture, and can no longer yield as formerly. In this way lands once of first grade have been reduced to the second or even third grade. Where it is not too late it should be looked to that no further deterioration of this kind shall occur, and that the soils which have suffered shall be brought back to something like their primitive strength and fertility.

The characteristic native growth of the soil is oak—white, red, black, Spanish, post, and black-jack oaks. Hickories are common, with "poplars"; also some walnuts, maples, chestnuts, dogwood, hazel-nut, and many other trees and shrubs. Rarely patches of poorer sandy spots are met with having a growth of pine trees.

The soils of the second bottoms, though generally not the best for cotton, may be richer than those of the uplands. When mellow and gravelly, they are often in dry seasons the best for cotton. The bottoms above overflow have sometimes a very fertile soil. Then again, they are too clayey and crawfishy.

No analyses have been made of samples of soils from this subdivision in Tennessee. Fortunately, however, the belt extends into the state of Mississippi, and the analyses of its soils there will, doubtless, fairly represent their composition here. The following analyses are taken from Professor E. W. Hilgard's report on cotton culture in Mississippi:

No. 216. *Soil from the table-lands* on the divide between Coldwater and Wolf rivers, near Lamar, Benton county, from a level tract below Summit ridge. Timber, black-jack, post oak, and hickory, with some sweet gum and a few Spanish oaks. Depth taken, 10 inches; quite mellow, and of a "mulatto" tint.

No. 235. *Subsoil* of the above, 10 to 20 inches.

No. 219. *Subsoil* from same section of land, but taken on the Summit ridge itself; resembles the last.

a It may be remarked here that the upland soil of this subdivision merges insensibly into that of the bluff region. Both are mellow, siliceous soils, and in their best condition are very fertile. The line separating them has not been accurately traced out, and the one on the map is simply an approximation. Many of the correspondents treat the soils of the two subdivisions as one, and so speak of them in their reports. The underlying loess of the bluff thins out eastwardly to a feather edge overlapping the orange sand, the two often, doubtless, contributing to the formation of the same subsoil.

## COTTON PRODUCTION IN TENNESSEE.

*Brown-loam table-lands of Mississippi.*

	Soil.	Subsoil.	Ridge subsoil.
	No. 216.	No. 235.	No. 219.
Insoluble matter.....	83.347	83.093	82.830
Potash.....	0.549	0.700	0.630
Soda.....	0.082	0.041	0.090
Lime.....	0.245	0.130	0.270
Magnesia.....	0.479	0.507	0.450
Brown oxide of manganese.....	0.700	0.332	0.000
Peroxide of iron.....	4.798	3.862	5.110
Alumina.....	0.282	7.729	8.090
Phosphoric acid.....	0.068	0.236	0.210
Sulphuric acid.....	0.062	0.054	0.020
Water and organic matter.....	4.195	2.716	3.140
Total.....	100.867	100.399	100.000
Humus.....	0.787		
Available inorganic.....	0.608		
Hygroscopic moisture.....	0.84	7.42	
absorbed at.....	17 C. <sup>o</sup>	17 C. <sup>o</sup>	

Professor Hilgard thus discusses these analyses:

The common chemical characteristics of these soils, and especially of their subsoils, are high percentages of potash and lime, with usually a large supply of phosphoric acid in the subsoil, at least of the heavier lands. Potash is not likely to become deficient in the subsoils at least; but the supply of humus is not large (as in fact is evident from inspection), and green-manuring is one of the most important improvements indicated. Originally this was not the case, for the surface soils were, and in protected spots still are, dark-colored to almost black when wet; but the washing away of the surface and the burning of the woods have served to deplete the surface of this and other important ingredients, so that over a large portion of the region it is the subsoil, and not the surface soil, as given in the analysis, that the farmer has to deal with. In this case the addition of vegetable matter is, of course, doubly important; and green-manuring of denuded tracts with cowpease is one of the most convenient, as it has proved to be one of the best, means of improvement. The analyses show that so long as the subsoil remains the question of restoration of a "tired" soil is simply one of time and judicious management.

The following are abstracts from the reports of correspondents bearing upon the features of this subdivision:

GILBERT PATTERSON, WEAKLEY COUNTY: Cotton grows well on any of our heavy clay loams. The second bottoms are better for cotton, excepting that while fresh it grows too rank. On the partly black, hilly lands cotton grows well. The black level or rolling upland soil, covering three-fourths of the county, is the chief one. It extends from the south line of this county to the Kentucky line, and from the east line of Weakley county to the Mississippi bottom. Its growth is white and black oak, "poplar," beech, hickory, and black and white gum.

JOHN C. LIPSCOMB, WEAKLEY COUNTY: The soil cultivated in cotton is the black upland, lying mostly in good-sized bodies of level land. It is a fine silty and clay loam about 12 inches thick, and is found on one-half the area of the county. No cotton is raised on second-class lands. The growth is beech, "poplar," ash, oak, and some walnut.

E. T. BOHANNON, CARROLL COUNTY: The soils cultivated in cotton are: (1) good upland with black sandy soil; (2) bottom land with black sandy soil; (3) hill land with a light gray soil. The black sandy upland is the best, and embraces about one-half of the lands here. It extends north 30 miles, west 50, and south 35 miles. To the east the country is broken and varied to the Tennessee river. The growth is oak, hickory, "poplar," gum, ash, and walnut. The soil has a clay foundation, which is underlaid by sand at from 15 to 30 feet.

Z. BRYANT, SR., GIBSON COUNTY: The cotton soils are largely upland. Here and for 40 miles north, 100 miles south, as far as the Tennessee river east, and for 50 miles west the soil is inclined to be sandy, with some gravel. The native growth is white, red, and black-jack oaks, hickory, gum, dogwood, walnut, poplar, beech, ash, chestnut, etc.

A. D. HURT, MADISON COUNTY: The kinds of soils cultivated in cotton are: (1) dark sandy upland and second bottom; (2) black-jack oak land or light sandy ridges, requiring constant attention to prevent washing; (3) buckshot, containing small whitish gravel. The chief soil is the upland or table-land. It covers perhaps three-fifths of this county, and extends west many miles and north to the state line. The growth is hickory, mulberry, ash, white and red oak, papaw, walnut, and "poplar". The subsoil is a red clay with very little sand, impervious when undisturbed, and underlaid by sand at from 6 to 12 feet.

J. B. BRANTLY, HAYWOOD COUNTY: The kinds of soils are: (1) level or gently rolling upland and second bottom—a dark brown soil with some sand; (2) soil similar, of less depth and more rolling; (3) that of overflowed bottom land; greenbrier land, and cypress swamps. The chief soil is the first, the dark brown sandy. One-half of this region is of this kind. It occurs over the entire county, and on the west and south into the adjoining counties. Its native growth is oak of different varieties, hickory, poplar, ash, walnut, dogwood, papaw, hazel-nut, and sumac. The subsoil is mostly a red or yellow clay, with some little sand; also some white clay, which is occasionally gravelly, underlaid by sand and gravel, or pipe-clay, at from 6 to 15 feet.

AARON WALKER, HAYWOOD COUNTY: The soils cultivated in cotton are: (1) Black upland loam in large bodies when properly cared for and not exhausted; (2) soils somewhat worn and mixed with clay; (3) worn soil, washed and exhausted. The land here before being worn is all of the first class, and is reduced to the second and third classes by bad cultivation. The character of the soil is only changed by being mixed with clay. I describe the land of Haywood county, which is all of the same character, excepting the overflowed or swamp lands of the river bottoms. All the soil, with the exceptions just stated, was originally black upland loam. Its extent was west 40 miles to the bottoms of the Mississippi, north to Kentucky, east 20 miles, and south 20 miles to the sandy soil of Fayette county. Its growth is poplar (*Liriodendron*), black oak, hickory, and gum. Thickness, from 4 to 6 inches usually. The subsoil is a tough red clay, baking hard when first exposed to the sun, but gradually becoming like the surface soil, underlaid by sand at from 20 to 30 feet.

H. M. POLK, HARDEMAN COUNTY: The kinds of soils cultivated in cotton are: (1) The siliceous and dark ashen-colored soil of the uplands, lying in long rolling slopes and in level plateaus, extending to many hundred acres in one body; (2) the somewhat heavier soils of Spring and Pleasant creeks; (3) the heavy soil of Hatchie river, mostly above overflow. With the exception of some pine land on the north of Hatchie river and in a portion of the southeastern corner of the county, the dark ashen-colored upland extends over nearly the whole county. Beyond this the soil spreads over Fayette, Haywood, Madison, Gibson, and Weakley, and parts of Shelby, Tipton, and Henderson counties. Its native growth is red, post, and white oaks, hickory, dogwood, red-bud, walnut, sassafras, and wild cherry. Average thickness, about 12 inches. The subsoil in Hardeman is a deep red rich clay, extending down from 10 to 18 feet. When turned up to the action of the sun and frosts it produces well. It contains no gravel, and water does not percolate easily through it. The soil yields from 1,000 to 1,800 pounds of seed-cotton on fresh land, or from 800 to 1,000 pounds after 20 years' cultivation.

#### THE SUMMIT REGION OF THE WATER-SHED.

This is the part of the upland or plateau slope through which the Tennessee ridge extends in its nearly south and north course from the state of Mississippi to Kentucky. The summit line of this ridge, dividing the waters of the Mississippi from those of the Tennessee, passes through the counties of McNairy, Henderson, Carroll, and Henry, and the region is made to include the counties of McNairy and Henderson, the eastern parts of Henry and Carroll, and the western parts of Hardin, Decatur, and Benton. On the west it merges gradually into the second subdivision, the brown-loam table-lands, and on the east reaches the breaks of the highlands, finally sinking away into the western valley of the Tennessee river. Its breadth along the Mississippi state line is 35 or 40 miles; but it grows narrower as we go north, until along the Kentucky line the breadth is reduced to 8 or 10 miles. The area is about 2,830 square miles. Though containing tracts of level lands, it is, as a whole, very broken. In some of the counties, as in McNairy and Henderson, the ridges are high and bold, presenting many wild and picturesque sections. In the northern part of the area the valley of the Big Sandy traverses it longitudinally and modifies to some extent the roughness of its features. The mean elevation of the water-shed and the heights of the ridges were referred to in discussing the elevation of the entire plateau slope.

The streams are generally small, those on the western side of the summit-line being merely headwaters of rivers flowing into the Mississippi, while those on the eastern side are necessarily small, on account of the proximity of the summit to the Tennessee river. The Big Sandy has such a course as to make it exceptionally large and long. Beech river, rising in Henderson and crossing Decatur county, is the next most important stream. The other streams consist of creeks and branches, some of the former being of noteworthy size.

The soil most frequently met with is a sandy loam derived from both the orange sand and older sandy strata. There is, however, a great variety of soils, the subdivision embracing, to a great extent provisionally, belts of country having different soils with different formations underlying them. Approaching the Mississippi state line, this variety is more marked, the area becoming easily separable into belts, each with a soil and a surface more or less distinct. Just within Mississippi, where they have been much more thoroughly studied than in Tennessee, they are named as follows, commencing with the most westerly: The *Flatwoods belt*, the *Pontotoc ridge*, the *Short-leaf pine and oak sandy uplands*, the *Black prairie belt*, and lastly the *Short-leaf pine and oak sandy uplands* again.

**FLATWOODS BELT.**—The *Flatwoods belt* extends through Tennessee, though its name is not especially descriptive of its surface or topography here, for it is often broken and hilly. Its characteristic underlying strata are beds of laminated or slaty clays, of dark color when wet, but light gray when dry, and varying in thickness from an inch to a hundred feet or more. With these are interstratified more or less sand. Often, however, these strata are covered and concealed from view by the deposits of the orange-sand formation. The soils are of two general classes, the clayey and heavy and the sandy and light, in accordance with the character of the strata upon which they rest. The superficial orange sand contributes a large proportion of its mellow light soil.

**SANDY PINE AND OAK UPLANDS.**—The *sandy pine and oak uplands* occur in two belts. We consider the more westerly first. The *Pontotoc ridge* area extends from Mississippi into Tennessee, but soon runs out, and is lost in the sandy pine and oak uplands. This area brings with it calcareous strata, limestone even, while a little to the west of it occurs "green (glaucous) sand", much like the "greensand" of the black prairie belt, to be described. Such formations exist in the southeastern corner of Hardeman county. With them, however, are many beds of interstratified sand, showing often interlaminated clayey leaves. Going north, the calcareous and glauconitic materials disappear and give place to laminated sands; but as with the flatwoods, so here the orange sand has spread its material over a great part of the belt, concealing the older beds, and in many sections giving character to the agricultural features of the surface. As provisionally given upon the map, including the area made by the projection of the Pontotoc ridge belt into the state, the sandy pine and oak uplands form the largest of the belts of the summit region, reaching throughout the state. On the Mississippi state line it is 15 miles wide, but has a less average width, and it is exceedingly varied in agricultural features. It has areas of poor pine uplands, but these make in the aggregate little of its surface; it is in the main rough and broken, yet there are numerous large bodies of arable land, which lie well and are productive. Some of these are uplands, others valley lands, of which those of the Big Sandy are to be noted.

**BLACK PRAIRIE BELT.**—The *black prairie belt* adjoins on the east the region just described. It is well known in Tennessee as a distinct area, but the designation *black prairie* is more generally applicable in Mississippi than

in Tennessee. The characteristic underlying formation is known as "greensand", and farther south as "rotten limestone". It is a great bed, at some points 300 feet deep, of clayey sand, highly calcareous, containing green grains of a soft substance (glauconite), and at many points abounds in fossil sea-shells, among which are huge oyster shells. The belt thus characterized has, commencing with the Mississippi line, an average width of about 8 miles for at least half way through the state. Farther north it becomes inconspicuous, and its limits in this direction have not been satisfactorily made out. It extends through the eastern parts of McNairy and Henderson counties and the northwestern corners of Hardin and Decatur. Much of it is very hilly and rough.

The soils of the belt, where resting upon the greensand, and normally formed from them, are more clayey and calcareous than is usual in West Tennessee. We would naturally look also for a greater percentage of potash in them, as the substance of the "green grains" contains this constituent in its composition. Where the land lies well this soil is often strong and fertile, and on ridges it is usually sandy and thin. The subsoil derived from the greensand is from 2 or 3 to 20 feet in depth. It is a grayish or dirty buff, tenacious material, locally called "joint clay", from its tendency to cleave when drying in irregular block-like masses.

At numerous points in McNairy and Henderson counties the greensand comes to the surface, forming "glades" or "bald places", spotted over with a stunted growth of trees or shrubs. In these places the formation often presents a gray marly surface, with little or no depth of soil or subsoil.

It is to be observed, however, that a large proportion of the soils of the belt are not those of the greensand. As in the belts described, over much of the area the orange sand covers and conceals all else, supplying on level or rolling spots its mellow, fertile soil, or on rugged places a sandy and gravelly one, of little or no fertility.

**EASTERN SANDY PINE AND OAK UPLANDS.**—The last belt of the summit region is the eastern belt of the *sandy pine and oak uplands*. This in its underlying formations and soils is much like the first belt of this name. Much of it is covered with the orange sand, which here often includes beds of gravel. It occupies a belt of country varying from 2 to 8 miles in width, and extends northward more than half way through the state. In Hardin county it reaches the Tennessee river, and here forms a part of the immediate valley of the river. This part is only included in the plateau slope of West Tennessee, for the reason that its formation, a sandy one, naturally belongs to this division of the state; and the same may be said of that part of the black prairie belt lying in the western part of Hardin and the eastern part of McNairy counties.

The following abstracts from reports of correspondents illustrate the features of the summit region:

**W. P. SMALLWOOD, HENRY COUNTY:** The cotton soils in this county are as follows: (1) Dark upland clay loam; (2) whitish clay of flat lands away from water-courses; (3) sandy loam of hazel hollows and branch bottoms. The chief soil is the dark upland loam, which constitutes about one-fifth of all, occurring sometimes in bodies of 1,000 acres or more. Its thickness is from 6 to 8 inches. The growth is black oak, hickory, black gum, grape-vine, etc. The subsoil is a red clay, mixed with white sand, is slightly leachy, usually well drained, and is underlaid by sand at from 8 to 10 feet.

**D. L. WILLETT, HENRY COUNTY:** The lands of the waters of the Big Sandy and the West Sandy rivers are referred to. The soils cultivated in cotton are: (1) Fine sandy loam of uplands, gray or dark, and in some places gravelly; (2) black sandy soil of lowlands, rather heavy, and in places rather wet, comprising the bottom soils of the territory between the Big Sandy and the West Sandy rivers; (3) second bottom rolling lands, clayey and gravelly. The chief soil is that of the uplands, extending to the bottoms and bordering the rivers, and has a depth of 6 inches. The growth is "poplar", hickory, grape-vine, chestnut, white oak, some ash and walnut, with some "post-oak glades" in the eastern part of the twenty-fourth civil district. The subsoil is a heavy red sand, containing soft black gravel, but not much rock, and is underlaid by sand at from 6 to 10 feet. The growth of soil No. 2 is beech, white oak, red gum, maple, poplar, and "water oak". The growth of soil No. 3 is like the last, excepting beech and adding papaw. There is less of soil No. 3 than of No. 2.

**J. H. JORDAN, CARROLL COUNTY:** The first and second bottoms of Hollow Rock creek, and also the hilly, rolling, and level uplands, are referred to. The following are the soils cultivated in cotton: (1) Coarse sandy clay loam, with red clay subsoil, of flat portions of the uplands; (2) black sandy soil, with clay subsoil, on hilly lands; (3) blackish soil of bottom land. The most important is the first-named, of which the proportion is one-third. It is 8 inches thick, and extends north 8 miles, east 4 miles, south 20 miles, and west 2 miles. The principal growth is red, white, and post oak, poplar, cherry, and hickory.

**W. C. TRICE, HENDERSON COUNTY:** The uplands, or the hilly, rolling, and level table-lands of the waters of Forked Deer river, are referred to. The chief soil is a sandy loam, with some red-clay loam. Three-fourths of the soils are of this kind. It is a fine sandy loam of a mahogany and orange-red color, is 4 inches thick, and extends 10 miles east, 100 west, 50 north, and 100 south. The growth is chiefly black, red, and post oak, and hickory. The subsoil is leachy.

**E. W. CUNNINGHAM, HENDERSON COUNTY:** The region, which includes the waters of Beech, Big Sandy, and Forked Deer rivers, is considered. The soils cultivated in cotton are: (1) That of second bottoms, mixed clay and sand, above overflow; (2) dark sandy soils of hilly and rolling uplands; these vary greatly, the south sides of slopes being sandy, the north sides usually a clay with little sand; (3) soil of lowlands, liable to overflow, which yield well in some seasons when frost is late. The chief kind is that of the second bottoms. It is one-fifth of the whole, and is from 12 to 24 inches thick. This soil extends back from the overflowed area for a distance of from 100 yards to 1 mile or more. In its growth are found red oak, poplar, dogwood, sumac, and hazel. The subsoil is generally a yellow or reddish-yellow and leachy clay. It contains gravel, and sometimes pebbles. Soil No. 2 forms about two-thirds of the whole, and lies in patches all over the county. Its growth includes red, post, and black-jack oak, and hickory. The soil of the lowlands, No. 3, is about one-tenth of the whole, and lines the rivers on both sides, with widths varying from 100 yards to half a mile or more. Its growth is generally white oak, poplar, gum, and elm, and sometimes beech.

**T. M. STUBBLEFIELD, HENDERSON COUNTY:** Refers to the southeastern part of the county, including the first and second bottoms of Cane, Flat, and Middleton creeks, which are waters of the Beech and Tennessee rivers, as well as to the hilly, rolling, and level table-lands between them. The soils cultivated in cotton are: (1) Black soil, mixed with sand, in the valleys; (2) gray sandy soils, on flat highlands, with sand or gravel underneath; (3) clay lands, with very little soil on the hills, having a "joint-clay" foundation. The first and third soils lie over a heavy stratum of "black dirt" (greensand) filled with shells and from 6 to 100 feet in depth, which extends north and south through the county, and is in some places 15 miles wide. The unchanged black dirt is about 15 feet below the surface,

and is a good fertilizer. The changed part (the subsoil) is called "joint-clay". The chief soil is the first given—the black, mixed with sand. It forms about one-eighth of all, is 6 inches deep, and extends north 20 miles, east 4 miles, south 10 miles, and west 4 miles. Its growth is poplar, beech, hickory, white and black oak, gum, and some walnut. In addition to this soil, there is a stiff land on the hills that produces cotton very well.

SYDNEY PLUNK AND F. E. MILLER, MCNAIRY COUNTY: Our location is near the dividing ridge of the Mississippi and Tennessee rivers, on the waters of Sweet Lips creek, a tributary of the Forked Deer river. The chief soils cultivated in cotton are: (1) Black, fine sandy loam, found principally in small valleys; (2) well-drained second bottom or branch bottom lands, a black, loose sandy loam; (3) fresh uplands, with clay subsoil. The first named is the chief soil, a black sandy loam, which includes one-half the land in cultivation. The growth in the bottoms is hickory, dogwood, maple, gum, and white oak; in the second and branch bottoms, red, post, black, and white oaks, poplar, beech, red-bud, papaw, and buckeye; on the high uplands, black-jack, red, black, post, and Spanish oaks, and scrubby hickories. There are three kinds of land in this county, which change but little in different localities, namely, the black sand, the yellow sand, and the gray clay land.

W. J. SUTTON, MCNAIRY COUNTY: The locality is on the waters of Owl creek, of the Tennessee river, and on the east side of the watershed of West Tennessee. The soils cultivated in cotton are: (1) Soils of the first and second bottoms, black and mixed with calcareous matter, the subsoil being a marl or "joint-clay"; (2) second bottom black loam, with some sand, much like No. 1, and subsoil the same; (3) quite a variety, mostly upland, yellow, sticky clay, some as dark as the bottoms; also the "bald knobs" and shell beds. The first and second bottoms make up about one-fourth of this region, and extend north to Owl creek, and then, interspersed with shells and sand, far north and south, east nearly to the Tennessee river, and west to the top of the water-shed. The timber on the bottom lands is poplar, gum, hickory, elm, walnut, box-elder, etc. The soil is a fine sandy loam, some of it putty-like, and called beeswax, of a blackish color, and averages from 4 to 9 inches, though sometimes 2 feet deep. The subsoil includes the jointed clay, which reaches down to the marl or greensand. The soil is easily tilled in wet or dry weather, but more easily when moderately wet or dry. The third class of soils makes up about one-half this region. Their growth is black-jack, post, red, and Spanish oak, dogwood, and hickory. The thickness is from 2 to 4 inches, and when the subsoil is present it is a sticky, yellow clay. The underlying formation is "greensand".

### THE WESTERN VALLEY OF THE TENNESSEE RIVER.

This division has been briefly characterized before. As compared with the plateau slope just described, it shows a marked falling off in the percentage of land in cotton. (See map showing relations between area and cotton acreage.) The northeastern part of the division, that east of the Tennessee and north of Duck river, is in the "penumbral region" of cotton culture, very little cotton being produced. Passing from this to the southwestern part, the percentage rises, until in the western portion of Hardin county and on the eastern border of McNairy it reaches the maximum for this division.

The Western valley, as already stated, is a long, narrow, and comparatively broken area crowded between the spurs and breaks of two plateaus, one on the west and the other on the east side of the Tennessee river. Its limits on both sides may be taken to be the lines respectively along which the highlands for the most part break away. As thus limited, it has an average width of not more than 10 or 11 miles, with an area, say, of 1,200 square miles (a small portion of the state), and embraces the greater parts each of Benton, Decatur, and Hardin counties, much of Henry, a little of McNairy, the western portions of Stewart, Houston, Humphreys, and Perry, and the northwestern corner of Wayne. The bounding highlands on both sides are fringed with numerous spurs, many of which run within 2 or 3 miles of the river, and some quite to it. Interlocked with the spurs, the valley sends out many ramifications, among which are the narrow valleys of the tributaries of the Tennessee river, not a few of which run back 10 or 15 miles and some 20 or more before they terminate. Some of the creek valleys of Hardin and Wayne are among the longest ramifications. These are serpentine and narrow, averaging not more than a mile in width, but at many points are very fertile. The spurs separating them are high, flat-topped arms of the highlands, like most of the spurs on this side of the valley. Buffalo river, with the lower part of Duck river, in Wayne, Perry, and Humphreys counties, presents in its valley an important ramification. This, however, and the upper parts of the long creek valleys mentioned, are to be regarded as deep cuts in the division next considered, the Highland Rim. The valley of the Big Sandy is a ramification on the western side of the division.

Taking the high-water elevation of the Tennessee river as the floor of the valley under consideration, its average elevation above tide is about 360 feet. The depth of the valley below the highlands that bound it on the east is, say, 500 feet, and below those on the west not far from 350 or 400 feet.

The formations of the division are of many kinds. We have, in our progress eastward, the last of the sandy and clayey strata of West Tennessee and the first of the solid strata, the limestones and siliceo-calcareous strata of Middle Tennessee. It thus includes the junction of the soft rocks of the one with the hard rocks of the other—a junction which appears to mark the position of the ancient coast-line referred to on a previous page. Here and there also, overlying the formations on each side of the junction, and indeed on both sides of the Tennessee river, are patches of sandy material and gravel pertaining to the eastern margin of the orange-sand drift.

In the more southern counties (Decatur, Perry, and the eastern part of Hardin and Wayne) numerous "glades" are met with—graveley, marly places, resulting from the appearance at the surface of a gray, often shaly, limestone, with but little or no covering of soil. With the exception of patches of bushes or shrubby cedars, these places are nearly naked. These glades are sometimes several acres in extent, and make in the aggregate a large area, occurring usually on hillsides and slopes, but often forming the surface of isolated and low knobs, and are wholly different from those before spoken of as characteristic of the "black prairie belt". In another section of the



valley, however, the western part of Hardin and the eastern part of McNairy, many of the glades of the black prairie belt do occur, which have been already noticed in connection with the belt to which they belong.

Alluvial bottoms occur alternately on the two sides of the river. These are not often more than a mile wide; yet their aggregate area is very considerable. The bottoms usually have high "front-land" along the river and lower "back-land" away from it, the latter sometimes running into swamps, often cypress swamps. The bottoms of the tributary creeks also are to be taken into account, as they make an important addition to the agricultural capabilities of the valley.

This variety in formation gives a great variety of surface and soil. The alluvial lands are generally very productive, and yield abundant crops of Indian corn, the chief product. Much of the second bottom and arable sloping lands of this division and of the ramifications running out from it, especially on the eastern side of the river, are made gravelly by the angular flinty *débris* from the siliceous rocks of the ridges, and where not worn too much are generally very mellow, productive lands. Some of the limestone lands also are gravelly, from the liberation and shivering of the flinty seams contained in the underlying rocks. To these may be added patches of gravelly land resting on the water-worn gravel of the drift. Areas of flatwoods land occasionally occur, as in Hardin county.

The chief products of the valley are, in the order of greatest importance, Indian corn, wheat, cotton, oats and tobacco. With these also must be given peanuts, a crop of no little importance in some sections. While most of the cotton is the product of the southern part of the division, most of the tobacco comes from the northern part.

The following abstracts from the reports of correspondents refer chiefly to lands in the western valley:

A. C. PRESSON, BENTON COUNTY: For 40 miles along the eastern boundary of the county the river has a line of bottoms averaging about 1 mile in width, the soil of which is excellent for cotton. The bottoms are overflowed in very high freshets, making it sometimes too late for planting. The Tennessee river hills, back of the bottoms, are rocky, and generally do not produce cotton well. There is a dividing ridge between the waters of the Tennessee and Sandy rivers for three-fourths of the length of the county, the eastern side of which is mostly rocky and gravelly, and is not so good for cotton; but the western side is mostly sandy, and is good cotton land. Nearly all the lands of Sandy river in this county produce the staple well, excepting its first bottoms, which are too wet. Some of the hilly lands of Sandy river wash badly. The bottoms of the county, when not too wet, average more per acre than the uplands; yet there is more cotton grown on the uplands, for the reason that they are more easily worked. The kinds of soil cultivated in cotton are: (1) Bottom lands, black sandy soils with clay subsoils, such as those of the Tennessee river and of Birdsong, Cypress, and Rushings creeks; (2) uplands, also black sandy soils with clay subsoils; (3) yellow sandy soil. The chief soils are those of the bottoms. They form one-ninth or one-tenth of the whole, and are found on creeks and along the whole length of the Tennessee river; thickness, about 12 inches. The growth is elm, poplar, hickory, hackberry, sugar-maple, oaks, cypress, etc. The clay subsoil is at first yellow and hard, but upon cultivation becomes more like the soil, and is underlaid by sand or rock at various depths. Soils of the second class are found on the uplands, and make about 5 per cent. of the whole, extending pretty much through the length and breadth of the county. The growth is oak, hickory, poplar, chestnut, etc. The third class includes rolling sandy lands, which aggregate one-third or more of the whole, with a thickness of soil of about 5 inches. These lands within the county extend 10 miles north from Camden, south 20, east 5, and west 3 miles, but within the state 60 miles both south and west. Growth, much the same as that of the second class. The soil is from 3 to 5 inches deep, and is easily cultivated, whether wet or dry.

JOHN McMILLAN, DECATUR COUNTY: There is a variety of lands in this county, the most of which are cultivated in cotton, excepting those that are low and marshy. They comprise: (1) Fresh sandy lands; (2) clay lands, manured; (3) common flat lands. The chief soil is the fresh sandy land. One-third of the county has a sandy soil, and this is true of the country as far west as the Mississippi river. The growth is various, but is chiefly of species of oaks. The chief crops are corn, cotton, wheat, oats, and peanuts. The land is apparently best adapted to the first two. Cotton comprises about one-fourth of the crops.

JOHN H. PEARCY, DECATUR: The lands of the waters of Turkey creek and Beech river cultivated in cotton are principally: (1) The second bottom and ridge lands, and (2) the common ridge lands. The chief lands are the first mentioned, and about two-thirds in this region are of this kind. They extend in each direction from 5 to 10 miles, and their growth is beech, walnut, hickory, and various oaks. They are generally blackish gravelly loams with a thickness of 8 or 10 inches. The subsoil is yellow or red, and is underlaid by sand, gravel, or rock at 5 feet. The chief crops are corn, cotton, oats, wheat, potatoes, and sorghum-cane. This land is best suited to corn and cotton, and about one-third is planted in the latter. The land of the second class, the common ridge land, forms about one-third of the cultivated land, and extends 10 or 12 miles in each direction. Upon it grow hickory, dogwood, post, and other oaks. Its soil is about 4 inches thick, resting upon a subsoil, which is underlaid by sand and gravel, and is best adapted to cotton and small grain. About one-half of the tilled land is in cotton.

L. D. CRAWLEY AND J. G. YARBOROUGH, DECATUR COUNTY: This report refers to the lands of White's creek and the Tennessee river. The bottoms of the Tennessee are tolerably wide, and the lands on the west side, in Decatur county, are much better for cotton than those on the opposite side, in Perry. Fronting the river the soil is black and sandy, but back of it the soil has a mahogany color. The soils cultivated in cotton are as follows: (1) Yellowish sandy soils of the second bottom of the Tennessee river lying in ridges or swells parallel with the course of the river; (2) upland dark soil, with clay subsoil; (3) dark gravelly slopes or points of hills that approach the bottoms. Cotton on the lowlands matures as early as it does on the higher lands, excepting in some very low flats lying between the swells or ridges in the bottoms. In these the cotton is later and liable to be caught by frost, but when frost is late the flats yield well. The upland soils are good, excepting portions including limestone breaks. The chief of these, the yellowish sandy soils of the higher parts of the bottoms, are fine sandy loams from 8 to 10 inches thick. In this vicinity they make a strip half a mile wide and 10 miles long. Similar strips are met with at intervals for 10 miles down the river. The growth is beech, poplar, sugar-tree, sweet and black gum, hickory, white oak, elm, and ash. The subsoil is light clay with a good deal of sand, and sometimes hard-pan with no sand, and is underlaid by sand and gravel at 50 feet. Cotton and corn are the chief crops, the proportion in cotton being about two-thirds. On the uplands the subsoil is a deep red clay, which becomes lighter on exposure.

J. C. MITCHELL, HARDIN COUNTY (west of the Tennessee river): The remarks apply to the region drained by White Oak creek and its tributary, Hurricane creek, the Tennessee river lying on the east, and includes first and second bottoms and hilly and rolling uplands. The upland soil is generally in small bodies, and produces well for a few years, but soon washes into gullies, and is abandoned. The soil is

pretty uniformly good in the valleys, but poor on the hills. The overflows from the Tennessee river in the spring back the water over the creek bottoms, often delaying planting, so that cotton does not mature before frost. With late frosts fine crops are made in the bottoms, especially if the season is rather dry. The uplands are, upon the whole, much more reliable than the bottoms. The cotton soils are: (1) Black upland soil, lying mostly on the hillsides and branch bottoms; (2) dark-loam soil of the Tennessee river bottom, generally subject to overflow; (3) rich sandy bottom near the river bank. The chief soil is the black-hazel upland, which forms one-half of the cultivated land, and extends west 15 miles, north and south 25 or 30 miles, and east but a few miles. There is little of such land east of the Tennessee river. Its average thickness is 12 inches in the bottoms and 3 on the hillsides, and its natural timber is white and black oak, hickory, ash, walnut, red elm, sweet gum, and post oak. The subsoil in the bottoms is a tough, yellow clay; on the hillsides it is mixed with gravel. The land is difficult to till in wet weather, but easy in dry, and is early when well drained. The chief crops are cotton and corn, the soil being best adapted to the latter. At least one-half of this land is put in cotton. Soil No. 2 belongs to a narrow belt from 1 mile to 5 miles wide, running along the river and through the county. It is, however, not continuous, being interrupted at intervals by the higher lands coming in to the river. Upon this flourish poplar, gum, elm, ash, walnut, red-bud, linden, and dogwood. It is a fine sandy and clay loam with a thickness of from 2 to 3 inches. Its subsoil is underlaid by rock at from 12 to 20 feet. Very little cotton is planted upon it, corn being the principal crop. Soil No. 3, sandy bottom, lies in very narrow strips along the river, so far as I am acquainted, say 30 or 40 miles. Its timber is cottonwood, ash, red-bud, birch, and walnut. This soil is a coarse sandy loam, and is easily tilled at all times. Its subsoil is a clay, generally dark, but sometimes bluish, underlaid by rock at 12 feet, and is best adapted to cotton, with which three-fourths of it is planted.

J. W. IRWIN (east side of the river): The region is drained by the waters of Horse and Turkey creeks, with the Tennessee river on the west. It includes first and second bottoms and varied uplands of the creeks, with the bottoms of the river, and embraces front- and back-lands and cypress swamps.

In this district are uplands and some ridges, but principally level lands, susceptible of cultivation, and flatwoods. The soils planted in cotton are: (1) The black sandy soil of the creek and river bottoms; (2) second bottoms and highlands contiguous to creeks; (3) flatwoods. The chief soil is the black sandy loam with a grayish clay foundation. About one-fourth of the land is of this kind, and occurs in an area of 8 by 2 miles in this district. The timber is white oak, scaly-bark hickory, box-elder, ash, hackberry, mulberry, gum, poplar, and other kinds. The soil is dark silt and sandy loam, and near the river it is 3 feet thick, but 2 miles back it is reduced to 1 foot. It contains no pebbles of any kind, is easily tilled when seasonable, but becomes too hard to plow when very dry. The soil is early when well drained. The chief crops produced are corn and cotton, yielding from 40 to 60 bushels of corn, or from 800 to 1,500 pounds of seed-cotton per acre. About a fifth part of the river bottom is put in cotton. Soil No. 2 is designated "ridge land", although much of it is level. There is about one-fifth of this. Its growth includes red, white, and post oaks, hickory, and dogwood. It is a fine sandy, gravelly, and blackish loam with a clay foundation, and has an average thickness of from 4 to 8 inches.

The subsoil in second bottoms is a grayish clay; on upland, a red clay. It contains gravel and pebbles, and is underlaid by sand and gravel, and at some places by limestone, at a depth of from 2 to 4 feet. The soil is easily tilled in dry seasons, and is warm, producing early crops if well drained. It is best adapted to cotton, corn, and vegetables. About one-fifth of it is in cotton. Soil No. 3 is that of the flatwoods, and about three-fifths of the land is of this kind. Its extent is about 8 by 2 miles. The timber is post and red oaks, with black and red oak undergrowth. It is a fine sandy loam, grayish and mahogany colored, and has a thickness of from 2 to 6 inches. The subsoil is gravelly, and is underlaid by sand and gravel at from 3 to 20 feet. It tilles easily in dry seasons, is warm when well drained, and is best adapted to corn and vegetables. About one-tenth part is put in cotton.

W. J. WHITE, HUMPHREYS COUNTY (southwestern part): The region includes the first and second bottoms and highlands of the Buffalo and Tennessee rivers. Most of the cotton produced last year (1879) was cultivated in the valley of the Buffalo river. There is but little cotton raised, the season being rather short. The Tennessee river bottoms, when put in cotton, yield generally 1,000 pounds of seed-cotton to the acre. The land of the creeks making into the Tennessee river is well suited to the culture of peanuts, and this is the most profitable crop; it is also very good for corn. The Duck river lands equal the best for corn. The Buffalo river lands have a rich soil, 3 to 4 inches deep, with a clay foundation, and are adapted to the raising of most any kind of crop. The valleys are broad and level, and the Buffalo is a beautifully clear stream. The soils may be classified as follows: (1) Sandy; (2) black land; (3) soil with a clay foundation. The river lands have mostly black soil; that of the creeks are gravelly and clayey. The subsoils generally rest upon limestone or flinty rocks, and often upon a soft weathered rock that can be cut with an ax and is used for building chimneys. Upon the best of the soils the growth is poplar, walnut, gum, hickory, white, red, and black oaks, with other timber.

### THE HIGHLAND RIM.

The general topographical characteristics and the limits and area of the Highland Rim have been briefly given (see also diagram). It is a great rim of flat highlands, within which lies the Central Basin. I have divided the area, for convenience, into two subdivisions: the western and the eastern. The first includes the following counties and parts of counties: Montgomery, Robertson, Dickson, Hickman, Lewis, Wayne, Lawrence, the greater parts of Perry, Humphreys, and Stewart, considerable portions of Giles, Hardin, Williamson, Cheatham, and Sumner, and small parts of Maury and Davidson. The second includes the greater parts of Macon, Clay, Overton, Putnam, De Kalb, White, Warren, Coffee, and Franklin, considerable parts of Jackson, Cannon, Moore, and Lincoln, and small portions of Smith, Bedford, Van Buren, and Grundy.

As a cotton area the Highland Rim is of little importance, the most of it being referable to the "penumbral" region of cotton culture. It did not in all produce in 1879 more than 4,000 bales, and of this five-sixths was reported as the product of three counties, Hickman, Wayne, and Lawrence. The cotton yield of the entire division was not during the same year a third of that of Rutherford, a county of the Central Basin. And further, most of the cotton accredited to the three counties mentioned was not raised upon the highlands, but in the deep valleys traversing them—valleys which, with their soils and rocks (those at least of Hickman and Wayne), can be regarded as ramifications either of the Central Basin on the one hand or of the Western Tennessee valley on the other. Thus, but little cotton came from the highlands proper. The exceptions are certain southern parts of Wayne and Lawrence and the cotton-producing land of the eastern subdivision, most of the latter being on the highlands. An inspection of the cotton percentage map will give information as to where cotton is cultivated in this division, and in what relative proportion. It may be observed that the low percentage colors separating the two chief cotton regions of Tennessee lie in the western subdivision of the rim.



In this large division the depth of the soils, together with the underlying earth or *débris* down to the rocks, is often very great. This is seen in digging wells, in the railroad cuts, and in the great excavations made at the iron-ore banks, nearly all of which west of the Cumberland table-land are within the area of the rim. For the most part, the soils and all the earthy matter below them have been derived from the decay of the underlying solid rocks in place. The exceptions are due to the occurrence here and there, often on the highest flats or summits, of spots in which the soils rest upon water-worn gravel, the latter being outlying patches of the orange-sand drift. Often the worn gravel is mixed with the angular cherty *débris* which has never been transported.

There are two chief soils in this division, as shown on the agricultural map, the *siliceous* (No. 11 of the map) and the *calcareous red clay* (No. 7b).

**SILICEOUS LANDS.**—The siliceous soil is thin, often light-colored, and rests upon a yellowish, sometimes reddish clay-subsoil. It is, as a rule, gravelly, made so by the angular flinty *débris* of layers of the underlying formation, the latter in general a siliceo-calcareous rock, but often varying from a limestone in one locality to beds of massive chert in another. So far as the rocks and soils are concerned, extensive portions of the area of the siliceous soils, especially portions bordering the Central Basin, may be said to be "leached" sections of country; that is to say, sections more or less deprived of calcareous matter by the action of water. They are now regions of freestone water, and as such, in connection with their elevation and the fact that they often supply springs of sparkling sulphur water, present acceptable sites for summer retreats, both for invalids and for pleasure-seekers. The leached condition is indicated by the freestone water, the poverty of the soil, and the frequent occurrence of massive layers and bluffs of chert once interstratified with or containing calcareous matter.

The land in general is arable, yet sparsely cultivated, most of that in cultivation pertaining properly to the area of this soil lying in the shallow valleys of the smaller streams. The chief products are Indian corn, wheat, oats, and tobacco. Much of the area is in woods, presenting, indeed, in many parts, extensive flatwoods with open growth, chiefly oaks of moderate size. Many such sections are known as "the barrens". In dry places black-jack and scrubby red, Spanish, and black oaks are met with; in swampy areas, willow and water oaks; then again a better class of timber occurs, especially on slopes, such as white oaks, hickories, chestnut, poplar, and sourwood.

It may be added that within the limits of the siliceous soil, as given upon the map, there are certain regions of variable extent whose soils approach in agricultural characteristics the calcareous red clay next described, and make indeed a transition from the siliceous to the red clay. In these transition areas the rocks making the red clay soil begin to appear. The areas may be found in both subdivisions of the rim, but occur most extensively on the midway highlands between the Central Basin and the western valley of the Tennessee river. But in these, as elsewhere within the limits of the siliceous soil, the lands mostly in cultivation are those of the valleys.

**CALCAREOUS RED CLAY.**—The calcareous red clay is one of the strong, fertile, and durable soils of the state, ranking in many sections next to the blue-grass soils of Kentucky and Tennessee. It is a great tobacco, corn and wheat soil in both the states mentioned and a good cotton soil in Alabama, and nearly one-third of the entire tobacco crop of Kentucky was produced in 1879 upon this soil. Montgomery and Robertson, the leading tobacco counties of Tennessee, have this for their chief soil. It is warm, mellow, and easily tilled, much of which is due to its being tempered with the fine gravel and siliceous grains of crumbling chert. When first broken it is a brown loam from 4 to 6 inches deep, which changes to red by cultivation, becoming mixed with the red clay subsoil.

The rocks underlying the red clay soil belong to the Saint Louis group of geologists. They are generally pale-blue fossiliferous limestones, containing often cherty layers or nodules. By disintegration and decay these rocks supply, more or less abundantly, masses of leached spongy fossiliferous chert, which are scattered over the surface and through the earthy matter below, becoming, indeed, everywhere characteristic of this soil area. The red color of the subsoil is due to iron oxide liberated by the halfway decay or leaching of the chert layers or of flints, which originally in the limestones were rich in iron.

A marked feature of the area of the calcareous red clay, and one well-nigh universal, is the presence at the surface of hopper-shaped sink-holes. These are very numerous in the rim and highland regions of both Tennessee and Kentucky. They communicate with caves below, through which flow subterranean streams, the whole making an underground system of drainage of great extent.

The geographical range of the red clay is best seen upon the map. A large section lies in Kentucky and Tennessee, chiefly within the great bend of the Cumberland river. Much of this in the southwestern part of Kentucky, and reaching a little way into Tennessee, was formerly known as the "Barrens", and has a curious history. The following is from the first volume of Owen's *Geological Report of Kentucky*:

In the early settlement of Kentucky the belt of country over which it [the red clay soil] extended was shunned and stamped with the appellation of "Barrens". This arose in part from the numerous cherty masses which locally incumbered the ground, in part from the absence of timber over large tracts, and in consequence of the few trees which here and there sprung up, being altogether a stunted growth of black-jack oak [black], red and white oaks. The value of the red calcareous soil of the "Barrens" is now (1856) beginning to be appreciated, so that lands which formerly were considered hardly worth locating are now held at \$25, \$30, and, in the neighborhood of some towns, even as high as \$50 an acre. At the present time the so-called "Barrens" of Kentucky are, to a considerable extent, timbered with the above varieties of oak, hickory, and occasionally butternut, black walnut, dogwood, and sugar-tree. The old inhabitants of that part of Kentucky all declare that, when the country was first settled, it was for the most part an open prairie district, with hardly a stick of timber sufficient to make a rail, as far as the eye could reach, where now forests exist of trees of medium growth obstructing entirely the view.

Another large and important section lies in a belt immediately west of the Cumberland table-land. This belt extends in both directions through Tennessee, northward into Kentucky and southward into Alabama. A limited and isolated area in Cannon and De Kalb counties occurs around the base of the Short mountains.

The growth of the red soil is chiefly oak; that of the "Barrens" is spoken of in the quotation given. Omitting the black-jack oak, many flat portions of the area of this soil in Tennessee, outside of the region referred to, have a similar growth. In sections with a rolling surface, on slopes and in the valleys, the timber is often heavy. Good-sized oaks, white, black, and red, abound, with more or less poplar, ash, black gum, walnut, and in places wild-cherry and sugar-tree.

As in the case of the other divisions, we append here for further illustration the following abstracts from reports of correspondents:

**J. M. GRAHAM, HICKMAN COUNTY:** The first and second bottoms of Piney creek and Duck river, as well as the hilly, gravelly uplands of the same streams, are referred to. The hills planted in cotton are those running up from the second bottoms to the tops of ridges. Cotton is liable to be caught by early frosts, especially in the bottoms and on the most fertile lands. A dry September is preferred, as it hastens the plant to maturity. The soils cultivated in cotton are: (1) Bench or second bottom lands, a grayish or gravelly loam; (2) hillside lands, when fresh, also grayish and gravelly; (3) lands on the tops of ridges. The chief soil is that of the second bottoms, which comprises about one-fiftieth of the lands, and occurs throughout the county. Its growth is black walnut, ash, poplar, white oak, elm, beech, and ironwood. It is a fine sandy loam with an average thickness of 10 inches, and has a stiff red clay subsoil, which indeed is true of all the lands excepting those of the first bottoms. The whole is underlaid by gravel and gray limestone at from 3 to 20 feet. This soil is cold and late as compared with the black limestone lands of the Central Basin. Its crops are Indian corn, peanuts, cotton, wheat, oats, rye, cow-pease, sorghum, clover, and grasses, but it is best adapted to corn, cotton, and peanuts. The proportion of cotton planted is about one-twentieth.

The hillside lands or uplands constitute about three-fourths of all and extend throughout the county. Its timber is poplar, different oaks, dogwood, and hickory, with occasionally ash and walnut. The soil is a gravelly, brown clay loam, 2 inches thick, and lies either upon red clay or red clay mixed with gravel. The underlying rock is limestone. This land is easily tilled in wet or dry seasons, and has a good surface drainage, but is late and cold. It is best adapted to the cereals. I estimate one-thirtieth of the crops to be cotton.

The ridge lands constitute about one-fifth of all, and are also found in all parts of the county. Their timber is black, white, red, post, chestnut, and black-jack oaks, dogwood, hickory, and occasionally poplar. The soil, about 2 inches thick, is a light gravelly, or a heavy clay loam. The subsoil is usually clay, but may be red, whitish, or yellow, in the latter two cases being leachy, in the other impervious. It contains white gravel and rounded pebbles in places, and rests upon gravel at from 1 to 4 feet. The soil is not easily tilled in wet weather. Like the others, it is late and cold, but is usually well drained, and is best suited to peanuts and cereals. Cotton comprises not more than a twenty-fifth part of the crops planted.

**N. M. HOLLIS, LAWRENCE COUNTY:** The county has a number of creeks which are tributaries of Shoal and other creeks and of Buffalo river, streams which empty into the Tennessee river. The lands may be classed under six heads, as follows: first bottoms, second bottoms, rich hills near the creeks, the less productive hills further back, the first quality of table-land, and the second quality of table-land, or the "barrens". Neither climate nor soils in this county are so adapted to cotton as to make it a profitable crop, though there is about one-tenth of the land, in the southern half of the county, devoted to this staple. The soils in cotton are: (1) Second bottoms; (2) southeast and west hillsides, or third bottoms; (3) tops of hills or highlands. The chief soil, a gravelly blackish loam, making about one-tenth of the lands, has no great extent in any one body. The numerous creeks run nearly parallel with each other, and the hills and table-lands between them cut up the lands into the different varieties enumerated. The natural timber is hickory, walnut, poplar, chestnut, five or six kinds of oak, beech, persimmon, sugar-tree, gum, elm, and hackberry. The soil is a gravelly and clay loam of a brown and yellowish color, having a thickness of from 4 to 24 inches. The subsoils in the county are gray, yellow, and orange-red, containing angular gravel, and underlaid by rock at 3 feet. The land is easily tilled in suitable seasons, producing corn, wheat, oats, rye, and cotton, the latter forming about one-tenth part of the crops. The soil is best adapted to corn and vegetables, and clover and grasses grow well. The second soil, that of the hillsides, makes a small part of the area. Its growth is poplar, chestnut, hickory, persimmon, and sassafras, and several kinds of oak. The soil is a gravelly clay loam from 3 to 12 inches deep, and the subsoil is underlaid by rock at 3 feet. The land is easily tilled, and about one-tenth of the crops is cotton. The soil or soils of the highland make more than half the area of the county, spreading widely out in all directions, with a native growth of chestnut, several kinds of oak, poplar, hickory, dogwood, and black gum. It is a gray and yellow clay loam, its subsoil containing angular and sometimes rounded gravel, with the rock at 2 feet below. The soil is early and warm, is naturally well drained, and is best adapted to wheat and corn. About one-fifteenth part is planted in cotton.

**M. F. WEST, MACON COUNTY:** The lowlands and the rolling and level uplands referred to are drained by the waters of the Barren river. Cotton with us is liable to be damaged by frosts in the fall; in fact, it is only raised in the county in patches for domestic purposes. No baling is done. Our soils may be described as gravelly soils, brown when fresh and yellow when worn, with a yellow and sometimes red clay subsoil, which work freely. The subsoil is often close, more or less impervious, and is underlaid by clay at 18 or 20 inches. The lands are early and warm when well drained and fertilized, producing as chief crops corn, wheat, oats, and rye; but they are, perhaps, best adapted to wheat and rye.

**R. S. CLARK, GRUNDY COUNTY:** Our lands are on Prairie creek, a tributary of Elk river, and consist of first and second bottoms and uplands. Cotton is cultivated only to a limited extent. I have a gin which is patronized from parts of three counties, Franklin, Coffee, and Grundy. The soils vary considerably in this locality. The chief one is the upland soil, which makes the greater part of the lands in this region. Its growth is hickory, walnut, and black and post oaks. In the creek bottom we find elm, ash, sweet and black gum, and white oak. The thickness of the soil of the uplands is from 4 to 12 inches; that of the bottoms 24 inches. The chief crops of the region are corn, wheat, oats, and potatoes, the soil being best adapted to the first three. The proportion of cotton planted is about 2½ per cent.

**JOHN F. ANDERSON, FRANKLIN COUNTY:** The report is confined to the valley of Crow creek, a tributary of the Tennessee river, which is hemmed in on both sides by high ridges or arms of the Cumberland table-land. Occasionally cotton is injured by late northwest winds and cold rains, the latter giving it the rust or sore-shin. We are, however, so well protected by the mountains that cotton is seldom damaged. Vegetation is two weeks earlier here than elsewhere in the county. The soils cultivated in cotton are: (1) The alluvial soil lying on each side of Crow creek, which differs greatly in character along the creek; (2) a fertile yellowish or sometimes brown soil, which is calcareous, like the underlying formation; (3) the soil of the mountain side, very rocky, thin, and not much cultivated. The chief land is the alluvial soil along the creek, constituting two-thirds of the lands in this region, and extending north and south from 12 to 14 miles, with a width of from one-fourth to half a mile. Its growth is sycamore, willow, beech, sugar-tree, black walnut, ash, hackberry,

red elm, and linden. This soil is a dark clay loam. That immediately on the creek is somewhat sandy, and has a thickness of from 3 to 24 inches. The subsoil is yellowish, compact, coarse, gravelly, rocky, and rests mostly on limestone at a depth of from 2 to 24 feet. Its tilling qualities are usually good. The chief crops are corn and cotton, the soil being best adapted to the first; but one-fourth of the total acreage is planted in cotton. The second or calcareous soil makes about one-third of our lands, and extends in narrow strips, like the alluvial lands, lengthwise through the valley. These strips average hardly a half mile in width. The timber is cedar, white oak, beech, yellow poplar, hickory, black walnut, elm, linden, and hackberry. The soil is clay loam, very fertile, 9 inches thick, brown when fresh, but sometimes becoming reddish. The subsoil contains sand, gravel, and pebbles, and is underlaid by limestone at from 1 foot to 10 feet. The soil is easily tilled and is well adapted to cotton. The third soil, or that of the mountain side, is thin and light, but does not here occur in bodies to any extent. The rocky mountain sides make fully one-half the lands, and are covered with all kinds of timber. The soil is well adapted to corn, vegetables, and fruit. No cotton is planted.

### THE CENTRAL BASIN.

The form and area of this important division, as well as its relation to the Highland Rim, have been given on page 14. Its contour and central position are shown both in the diagram on page 11 and on the agricultural map, the color area, *Sb*, of the latter indicating the extent and place of the basin as well as its soil. This division is the most populous portion of Tennessee, and is the center of wealth and political influence, and in its varied agricultural capabilities is the garden spot of the state. It supplies, as before stated (page 19), one of the centers of cotton production; a fact well brought out on the map showing percentages of area in cotton. The soils are suited to the production of all the great leading crops. Indian corn is the chief product, and in this the basin is much ahead of any other division. Then, in the order of acreage cultivated, follow wheat, cotton, oats, rye, and tobacco. Furthermore, in many sections pasture-lands abound, carpeted richly with "blue-grass" (*Poa pratensis*) and other nutritive grasses, on which live-stock of all kinds graze and mature.

The basin is mostly well defined on all sides by the steep escarpments of the highlands which surround it and rise from 300 to 500 feet above its floor. Their tops reach approximately the same general elevation, that of the Highland Rim making a high border, which, from favorable points within the basin, presents itself to the eye as a level wide-reaching horizon. The border, however, is a fringed one, made so by the multitude of ridges and spurs jutting in from the encircling rim.

The division is crossed by three rivers, the Cumberland, the Duck, and the Elk, which descend from the eastern side of the rim, flow in a more or less westerly direction, and finally escape from the basin through comparatively narrow and often rugged valleys cut severally through the northwestern, western, and southwestern sides of the rim.

It will aid in understanding the topography of the basin to state that if the narrow valleys or outlets through which the three rivers mentioned make their escape were filled up to the general level of the highlands the entire basin would fill with water and become a lake 120 miles long and 50 miles wide. At Nashville the water would be 300 or 400 feet deep, and one might sail over the city and never recognize its site. The summits of the highest hills in the basin would appear above the water as low, scattered islands.

The following counties and parts of counties lie within the division: All of Trousdale, Wilson, Rutherford, and Marshall; nearly all of Smith, Davidson, and Bedford; the greater parts of Sumner, Williamson, Maury, Giles, Lincoln, and Moore; large parts of Jackson, Cheatham, and Cannon, and small parts of Macon, De Kalb, Putnam, and Coffee.

The surface of the basin is in the main rolling, but level tracts abound. Here and there, especially as summit lines, separating the areas drained respectively by the different rivers and creeks, ridges more or less conspicuous start up, whose slopes are green with grasses, or, when in the wild state, are heavy with timber. Then again, limited sections are met with which are hilly or made wild with groups of interlocking ridges. There is one great ridge, known as Elk ridge, which is remarkable, and merits notice. It is, in fact, an almost unbroken though narrow arm, running entirely across from one side of the Highland Rim to the other, and cutting off, as a well-marked division, the southern end of the basin. In general, it has about the elevation of the highlands, and presents in its course but very few low gaps. It is the summit of the water-shed between the Duck and Elk rivers. On its northern side Elk ridge has but few spurs, and these are short. Its northern aspect faces the level or gently rolling regions of Maury, Marshall, and Bedford, regions checkered with alternating cotton lands and cedar glades. On its southern side, however, it is different. Here, running out southerly toward Elk river and southwesterly toward Richland creek for 5, 10, and 20 miles, are grand sprays of bold ridges, which have exceedingly rich slopes, and were covered originally with heavy forests. The valleys between the ridges, like the greater valleys of the two streams mentioned, are noted for the strength and fertility of their soils. The subdivision south of Elk ridge embraces all of Giles, Lincoln, and Moore counties within the basin, together with the southern end of Marshall. This whole region (not omitting the south and west sides respectively of the valleys of Elk river and Richland creek) is remarkable for the multiplicity of its ridges and for its fertile and beautiful valleys, the latter often wide and open, supplying great bodies of first-class land.

Originally most of the area of the basin was covered with cane, and even now this grows spontaneously in open woods when protected from cattle. Large oaks, poplar, sweet gum, walnut, hickories, hackberry, black locust, honeylocust, ash, elms, beech, sugar-maple, linden, dogwood, and red-bud abound. The "cedar glades", a characteristic feature of the basin, are areas more or less detached or scattered, upon which grow or have grown great cedar.

forests. They may be estimated to have covered in the aggregate 300 square miles. The soil of the glades is often black or dark colored, with a reddish-yellow subsoil, frequently thin and much mixed with fragments of thin flaggy limestone, or the soil may be confined to the joint fissures (widened by erosion) of outcropping limestone in place, the bare rock making most of the surface. The true glades uniformly occur upon the outcrops of a particular bed of rock known as the "glade limestone", a thin-bedded, flaggy limestone with clay partings having a maximum thickness of 120 feet and belonging to the Trenton period. Where the soil is of sufficient depth the cedars grow tall, straight, and of great size for the species (*Juniperus Virginiana*), now and then reaching 80 or 90 feet in height, with a diameter of 3 or 3½ feet, and fair trees grow in soil among the loose rocks or in the earth of the fissures. Cedar timber standing in the woods has often been sold for \$100 per acre. The trade in cedar logs and lumber has been for many years, and is now, one of great interest in the Central Basin.

A great ring or belt of the cedar glades is found in Rutherford county. This belt incloses an oval area of red cotton lands which is 24 miles long and 12 miles wide. The line of the Nashville and Chattanooga railway lies nearly lengthwise across this oval, cutting the belt of glades on opposite sides. Murfreesborough is in the included area a short distance east of the center. In Wilson county, and along Duck river in Bedford, Marshall, and Maury counties, are many glades, which cover large tracts. These occur also in Williamson and Davidson counties. The glades very generally either surround or lie contiguous to one of two kinds of cotton lands, sometimes, indeed, lying between bodies of the two kinds. One of these is represented by the red soil of Rutherford. Both will be considered hereafter.

The soils of the Central Basin, and the earthy layer of *débris* upon which they rest, have been in the main derived from the decay and disintegration of underlying rocks in place. The chief exceptions are the alluvial soils, which, however, may not aggregate the thousandth part of the whole. Exceptions also are found in the case of certain steep slopes, where *débris* from above has been washed or otherwise brought down upon the lower lands; but the exceptions are inconsiderable, and may here be passed over. The rocks underlying and giving origin to the soils (limestone of the Trenton period) are rich in fossil remains of plants and animals and in the materials of fertile soils. Locally, the strata appear to be horizontal or undulating; but complete sections across the basin show that they rise or swell up in a great dome, the top of which is in the central region of Rutherford county. From this central region the strata have been removed by denudation and the dome has been decapitated, thus exposing the lowest rocks (limestones) of the basin. Here, then, the latter are to be seen and studied. Passing from this central area in any direction the approximately concentric belts of other outcropping limestones are successfully encountered.

The limestones of the basin have in the aggregate a thickness of 1,000 feet, but the strata differ in certain particulars. All have impurities; some have an excess of sandy, others of clayey material in their composition; some abound in flints or chert, or in organic remains; one is thick-bedded, another thin-bedded; some disintegrate slowly, others rapidly. They are therefore grouped into subdivisions or kinds, each kind supplying a more or less characteristic soil. The kinds are enumerated below, beginning with the lowest, with notes.

1. CENTRAL LIMESTONE DIVISION.—A series of limestones, 225 feet thick, chiefly heavy-bedded. They are light-blue or dove-colored rocks, fossiliferous, containing black or dark flints, especially the lower ones. The soil formed is a warm clay loam, brown when fresh, but becoming red (chocolate or copper-colored), like the subsoil, after several years' cultivation, and is known as a red soil. The subsoil is generally deep, and rests often upon a gray, clayey bed, the rock following below at depths varying from 1 foot to 20 feet, with an average depth of about 10 feet. All the earthy matter above the limestone very generally contains fragments of decomposing flints. The soil and subsoil are mellowed by siliceous grains and gravel from this source, their color being derived from the iron of the flints. The native growth, representing well that of the entire basin, indicates strong land, this red soil being one of the best in Middle Tennessee for the culture of cotton. Lands having it, which we may call the "central lands", occur chiefly in Rutherford, Bedford, and Marshall, and to a limited extent in Wilson and Maury counties, and generally lie well. The largest single body of such land is in Rutherford, and is the oval area inclosed in a belt of cedar glades already spoken of. Fine level areas, the lands alternating with cedar glades, are found throughout Marshall and in the northwesterly part of Bedford. The following analyses are given of samples of soils of the central limestones that were never in cultivation. The region from which they were taken is gently rolling, and, where trees do not interfere, a slight elevation is sufficient to give the eye a range over a great extent of country. The depth of soils in this region varies from nothing, on rocky spots, to 15 or 20 feet, with an average depth of about 10 feet (C. F. Vanderford). The red subsoil varies from 2 to 5 feet in thickness. Under this we have a bottom bed of a more plastic light yellow or gray clay containing more or less angular flinty gravel or decaying chert, often easily cut with the spade.

No. 1. *Red clay soil*, taken from a wood-lot near Florence station, Nashville and Chattanooga railroad, a little less than 7 miles northwest of Murfreesborough, Rutherford county. Depth taken, 7 inches; growth, species of hickory, red, white, and post oaks, elms, ash, honey-locust, black walnut, wild-cherry, sugar-trees, poplar, hackberry, red-bud, dogwood, and papaw. Originally covered with cane.

No. 2. *Subsoil* of the above, taken at a depth of from 7 to 15 inches.

Nos. 3 and 4 are a *soil* and *subsoil* from near the same locality.

## COTTON PRODUCTION IN TENNESSEE.

No. 7. *Red clay soil* from J. W. Burton's place, 3 miles north of Murfreesborough, Rutherford county, taken 7 inches deep. The vegetation is about as that given above.

No. 8. *Subsoil* of the above, taken at a depth of from 7 to 15 inches.

*Red clay lands of the Central Basin, Rutherford county.*

	SEVEN MILES NORTHWEST OF MURFREESBOROUGH.				THREE MILES NORTH OF MURFREESBOROUGH.	
	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.
	No. 1.	No. 2.	No. 3.	No. 4.	No. 7.	No. 8.
Insoluble matter.....	79.580 } 83.208	66.092 } 77.789	80.850 } 86.116	81.070 } 87.750	75.350 } 82.660	76.470 } 82.480
Soluble silica.....	3.628	11.697	5.260	6.080	7.310	6.010
Potash.....	0.150	0.508	0.140	0.211	0.255	0.251
Soda.....	0.065	0.088	0.034	0.039	0.258	0.030
Lime.....	3.054	0.119	0.510	0.161	0.340	0.142
Magnesia.....	0.029	0.204	0.024	0.301	0.290	0.074
Brown oxide of manganese.....	0.195	0.272	0.175	0.157	0.038	0.140
Peroxide of iron.....	3.420	6.837	3.708	3.013	5.184	4.779
Alumina.....	4.988	10.190	4.173	6.220	5.507	7.774
Phosphoric acid.....	0.242	0.305	0.207	0.056	0.070	0.056
Sulphuric acid.....	0.080	0.079	0.102	0.008	0.070	0.072
Water and organic matter.....	4.962	3.728	4.784	1.966	4.962	4.230
Total.....	100.402	100.228	99.973	100.476	99.718	100.051
Hygroscopic moisture.....	8.64	8.84	7.23	5.59	7.29	7.03
absorbed at.....	23.9 C.°	17.2 C.°	23.9 C.°	17.2 C.°	22.2 C.°	22.2 C.°

[In the above analyses the first two soils (Nos. 1 and 3) resemble each other very strongly in every regard except their large lime percentages, which may be due in the case of No. 1 to some local circumstance, such as undecomposed particles of limestone, the country rock. Both soils may be considered as being fairly supplied with potash and heavily so with phosphoric acid, and, in the presence of so much lime, should be exceedingly thrifty. There is, however, a great difference in their subsoils, soil No. 1 being supported by a heavy clay, rich in phosphoric acid, extremely so in potash, though having a small and insufficient amount of lime. Soil No. 3, on the other hand, rests upon a subsoil less clayey in character, containing a fair percentage of potash, but very deficient in phosphoric acid, an unusual thing for clay subsoils. The deficiency in lime in both subsoils is accompanied by increased percentages of magnesia, which, in the surface soils, is extraordinarily low. In volatile matter and hygroscopic moisture the difference between the two subsoils is due to their clayeyness, and throughout are satisfactory. The soil and subsoil from nearer Murfreesborough both fall very short in their percentages of phosphoric acid, though they are fairly supplied with other necessary constituents.—E. W. H.]

2. CEDAR GLADE LANDS.—Next above the central limestones follow the thin-bedded flaggy limestones, making the *cedar glades* already spoken of. The soils of this division have been noticed. Where these are deep enough, and the cedar stumps and loose flags permit it, the land in the middle and southern portions of the basin is often cultivated in cotton. In general, however, comparatively little of it is produced upon the areas of the "glade limestones".

3. CARTER'S CREEK LIMESTONE LANDS.—Resting upon the flaggy limestones next comes a heavy-bedded rock, which, owing to its conspicuous outcrops on Carter's creek, in Maury county, I have called the *Carter's Creek limestone*. It is also known as the *Woodbury limestone*, this county town being built upon it. The rock is light blue in color, containing siliceous fossils and more or less chert, and is in all nearly 100 feet in thickness. Where the surface lies well, and is level or gently rolling or sloping, this rock often supplies a good agricultural country. Areas underlain by it occur in all the counties within the basin, and it underlies much of the surface outside of the "cedar glades" in the counties of Wilson, Rutherford, Bedford, Marshall, Maury, and Williamson. Excepting a few limited and unimportant spots, it is the lowest rock appearing at the surface in Smith, Trousdale, Sumner, Davidson, De Kalb, Cannon, Lincoln, and Giles counties. The soil above it is, when fresh, brown or dark; the subsoil is yellowish or reddish-yellow, rather clayey, and contains gravelly chert. It has not the markedly red color of the subsoils and warm soils of the central limestones. In the main, the lands of the Carter's Creek limestones, as compared with the central limestones, are second class. They do not generally lie so well, are often hilly, and are more frequently broken by rough, rocky places ("rocky roughs"), upon some of which cedars grow, making outliers of the true glades. Yet there are many sections where, topography being equal, they are little inferior to the central lands in tilling qualities and fertility. Both kinds of lands are often confounded with the true glade lands, all being designated "cedar lands". This is due to the fact that the central and Carter's creek areas adjoin the glades, the first concentrically within and the second without, or are locally and irregularly interlocked with them. A considerable proportion of the best of them, commencing with Wilson county and going southward, are cultivated in cotton with fair results.

4. *ORTHIS LIMESTONE LANDS*.—A series of sandy limestones from 70 to 100 feet in thickness, which we shall call the *Orthis bed*, follows in ascending order. In certain sections of the basin, as about Nashville, the upper portion of this series is a remarkably laminated current-formed rock of about 25 feet in thickness, made up in general of comminuted shells or "shell sand". The grains are generally calcareous, but are much mixed with siliceous grains. This portion has been named the *Capitol limestone*, as it supplied the stone for the capitol at Nashville. The lower and much the greater portion, as well as the persistent portion (being found in its geological horizon throughout the basin), is the *Orthis bed proper*, so named because at most points it is well filled with individuals of a fossil shell having about the diameter of a dime, known to geologists as *Orthis testudinaria*. The bed is, in general, a sandy or siliceous, often shaly, calcareous rock, and when freshly quarried is light blue in color; but upon thorough weathering it becomes a yellowish sandy shale or a porous sandstone, and blocks of the latter are often met with on slopes. Sometimes these blocks, when broken, show a blue unchanged nucleus within. The usual thickness is from 50 to 75 feet. In the eastern part of Williamson county, however, as about Triune, there is a local thickening of the bed, it becoming 150 feet thick or more. Owing to its sandy or siliceous nature, the rock has a degree of weather-resisting power, and hence contributes local plateaus and terrace and level lands to the topography of the basin. These local features are best seen west of the central areas of the basin in Wilson, Sumner, Davidson, Williamson, and Maury counties, and include some of the fairest and best farming tracts in Middle Tennessee. The soil, when first cultivated, is a rich brown loam, with a subsoil usually yellow, but sometimes reddish-yellow. The latter also is often made more or less gravelly by thin, sandy fragments, the *débris* of the disintegrated rocks. This soil is mellow, warm, well drained, and easily cultivated—characteristics which make it a favorite cotton soil—and its areas are generally known as poplar lands, the so-called "poplar" (*Liriodendron*) being, or having been, a very characteristic tree of its forests. Its growth, besides poplar, includes beech in places, especially on the slopes and in the heads of hollows, ash, sugar-tree, oaks, elms, dogwood, hickories, hackberry, black walnut, linden, box-elder, and other species, the variety being remarkably great. It must be stated, however, that the lands of this bed are not uniformly good, for tracts occur, especially on the slopes and ridges, where the soil has been washed or leached or otherwise impoverished, and the lands reduced to third rate, supporting an uninviting native growth. In cultivated fields in rolling or hilly regions, especially if old, it is no uncommon thing to see naked, badly washed, and "scalded" places with soil all gone, spotting at intervals along the slopes the horizontal line of the outcrop of the bed. These bare places are made so by careless cultivation and inattention.

The following analyses are given of lands of this region, the samples being obtained from localities lying well, and among the best and most beautiful agricultural sections in the state:

No. 11. "*Poplar*" land soil from Vanleer Polk's place, Maury county. Depth taken, 11 inches; timber growth, "poplar", sweet gum, walnut, oak, ash, elm, hackberry, honey-locust, and dogwood. Originally covered with cane.

No. 12. Subsoil of the above, taken at a depth of from 11 to 23 inches.

No. 13. "*Poplar*" land soil from the Hermitage, Davidson county. Depth taken, 10 inches; timber growth about the same as that of soil No. 11.

No. 14. Subsoil of the above, taken at a depth of from 10 to 22 inches.

*Poplar lands of the Central Basin.*

	MAURY COUNTY.		DAVIDSON COUNTY.	
	VANLEER POLK'S PLACE.		HERMITAGE.	
	Soil.	Subsoil.	Soil.	Subsoil.
	No. 11.	No. 12.	No. 13.	No. 14.
Insoluble matter .....	70.270 } 84.742	73.340 } 81.871	78.860 } 85.760	75.100 } 84.090
Soluble silica .....	5.472 }	8.531 }	6.900 }	8.030 }
Potash .....	0.319	0.327	0.238	0.584
Soda .....	0.059	0.080	0.047	0.114
Lime .....	0.515	0.547	0.378	0.468
Magnesia .....	0.342	0.358	0.368	0.444
Brown oxide of manganese .....	0.040	0.088	0.093	0.054
Peroxide of iron .....	3.683	5.285	2.627	3.693
Alumina .....	5.294	7.120	6.066	6.979
Phosphoric acid .....	0.340	0.342	0.255	0.318
Sulphuric acid .....	0.192	0.107	0.085	0.056
Water and organic matter .....	4.540	3.372	4.498	2.483
Total .....	100.084	99.497	100.415	99.223
Hygroscopic moisture .....	8.02	11.43	10.02	10.00
absorbed at.....	29 C.°	20 C.°	28.2 C.°	28.2 C.°



[The common and prominent characteristics of all of these poplar soils is a very unusually high percentage of phosphoric acid, accompanied by a large supply of lime—two prime conditions of thriftiness and durability. The supply of potash also is ample, and with a high hygroscopic power and easy tillage shows them to be altogether excellent soils.—E. W. H.]

5. MULATTO LANDS OF THE NASHVILLE SERIES.—In this subdivision we include all the remaining Silurian limestones above the *Orthis* bed. The series in the northern part of the basin is from 400 to 500 feet in thickness, but in the southern and southwestern part its thickness is much reduced. Here, too, its lowest layers often contribute to the topmost of the *Orthis* bed in making the underlying rock of many nearly level and superior agricultural tracts. It is in the main a sandy or earthy highly fossiliferous limestone, containing in its composition all the inorganic and some of the organic elements of exceedingly fertile and mellow soils. It is named, by way of distinction, the *Nashville series*, being well displayed about the city, especially on the higher grounds. The area of the outcrop of these rocks, and hence the area of the soils derived from them, sweeps around the basin in a ring or circular belt outside of the concentric outcrops and soils of the limestones already mentioned. This ring is much the wider on the western and southern sides, and supplies large and valuable tracts of land in the counties of Trousdale, Sumner, Davidson, Williamson, Maury, Giles, Lincoln, and Moore. The surface is in places level or gently rolling; then it becomes hilly, especially as we go westward toward the limit of the basin. On the eastern side, in Smith, De Kalb, the southeastern part of Wilson, Cannon, the southern part of Rutherford, and the eastern part of Bedford, the ring is not so wide. Here, however, numerous beautiful valleys and tracts occur, many of which, as we approach the eastern side of the basin, are separated by high ridges with exceedingly rich and fertile slopes. In fact, the sides of the basin all around are fringed with bold spurs, whose limestone slopes have unsurpassed fertility of soil. With these may be included the slopes of such high knobs and ridges as exist within the basin. Of the latter, Elk ridge, already spoken of, with its northern face and declivities in the southern parts of Maury, Marshall, and Bedford, and its southern ramifications in Giles, Lincoln, and Moore, is a noted example. Altogether, the aggregate area of the lands of the Nashville series must be one-half or more of the entire area of the basin. The soils are mulatto-colored loams with yellow subsoils, the latter tempered with cherty gravel and siliceous remains of fossils. Approaching the spurs and ridges, we often find the soils and subsoils of the slopes much mixed with gravelly *débris* that has been washed down or otherwise brought down from the siliceous sub-Carboniferous rocks that cap these jetting arms of the highlands. The growth presents a rich flora, including many species, among which may be mentioned great bur or overcup oaks, elms, ash, hickories, linden, black walnut, cucumber-tree, mulberry, cherry, and, on hill sides, yellow wood, coffee trees, butternut, and black locusts. Excepting in the more southern counties of the basin, the soils of the series are not considered as among the best for cotton, as the plant grows too luxuriantly, and does not mature in season. In Giles and Lincoln, however, they are, with the creek and river bottoms, chiefly relied upon for the production of cotton. In the southern part of Marshall, and in some parts of Maury and Williamson also, a good share of their areas is devoted to cotton culture. The following analyses are given of samples of this land:

No. 9. *Mulatto clay soil* from Belle Meade, a few miles west of Nashville, Davidson county. Depth taken, 8 inches; timber growth, oaks, elm, hickory, ash, linden, sugar maple, hornbeam, walnut, cherry, dogwood, and red-bud. Originally with an undergrowth of cane.

No. 10. *Subsoil* of the above. Depth taken, 8 to 20 inches.

No. 6. *Subsoil* from near the above. Depth taken, 8 to 20 inches.

*Mulatto clay lands of Nashville, Davidson county.*

	Soil.	Subsoil.	Subsoil.
	No. 9.	No. 10.	No. 6.
Insoluble matter.....	56.540	47.950	54.992
Soluble silica.....	8.840	11.010	10.540
Potash.....	0.468	0.752	0.242
Soda.....	0.108	0.174	0.054
Lime.....	6.540	8.382	3.015
Magnesia.....	0.569	0.615	0.675
Brown oxide of manganese.....	0.187	0.091	0.152
Peroxide of iron.....	7.286	9.584	9.761
Alumina.....	12.419	17.303	16.272
Phosphoric acid.....	0.593	0.355	0.175
Sulphuric acid.....	0.156	0.188	0.119
Water and organic matter.....	6.318	8.591	4.208
Total.....	99.994	99.995	100.145
Humus.....	1.670		
Available phosphoric acid.....	0.179		
Hygroscopic moisture.....	10.65	11.01	9.70
absorbed at.....	26.6 C.°	26.6 C.°	17.8 C.°

[The extraordinary percentage of phosphoric acid in soil No. 9 and its subsoil (the former exceeding all others heretofore analyzed), together with the unusual predominance of lime and large supply of potash, shows sufficient cause for the high estimate placed upon their productiveness, and gives promise of almost indefinite durability.—E. W. H.]

The following mechanical analysis has been made of the mulatto clay subsoil No. 10, of Belle Meade, near Nashville, by M. E. Jaffa, of the University of California:

	Per cent.
Clay .....	27.930
Sediment of < 0.25 <sup>mm</sup> by hydraulic value .....	29.203
Sediment of < 0.25 <sup>mm</sup> by hydraulic value .....	4.315
Sediment of < 0.50 <sup>mm</sup> by hydraulic value .....	6.799
Sediment of < 1.00 <sup>mm</sup> by hydraulic value .....	5.802
Sediment of < 2.00 <sup>mm</sup> by hydraulic value .....	3.390
Sediment of < 4.00 <sup>mm</sup> by hydraulic value .....	2.994
Sediment of < 8.00 <sup>mm</sup> by hydraulic value .....	6.967
Sediment of < 16.00 <sup>mm</sup> by hydraulic value .....	3.936
Sediment of < 32.00 <sup>mm</sup> by hydraulic value .....	5.096
Sediment of < 64.00 <sup>mm</sup> by hydraulic value .....	0.495
Total .....	96.327

The following abstracts are given in further illustration of the general features of the basin:

CHARLES F. VANDERFORD, RUTHERFORD COUNTY (central limestone area): The country around Florence station is referred to, which includes the first and second bottoms of Overall creek and Stone's river, together with the more extensive moderately rolling uplands. The region is nearly or quite surrounded by ridges and knobs from 50 to 100 feet high, which are mostly covered with a forest growth of cedar ("glades"). These cedar-covered ridges influence the winds and give us a local climate nearly as equable and quite as warm as that of the Tennessee valley in Madison and Limestone counties of Alabama. The kinds of soil cultivated in cotton are: (1) Red clay loam (brown when fresh) on uplands and slopes; (2) second bottoms, found at the bases of slopes; (3) river or creek bottoms, excellent for cotton when well drained. The chief soil is the brown or red clay loam, about three-fifths of the land being of this kind, which extends over an area embracing something more than 110 square miles. The native growth is white, black, red, and post oaks, elms, poplar, black walnut, hickories, wild cherry, black locust, and honey-locust. The soil is from 6 to 20 inches in thickness; the subsoil is a rather stiff clay, for the most part mixed with rotten and comminuted limestone and chert, which changes by weathering so as to become nearly as fertile as the surface soil. Clay thrown from railroad cuts or from wells, after exposure for a few months, will produce almost any crop, and such clays are used with very satisfactory results as a top-dressing for certain of our black soils. The subsoil is underlaid by limestone at from 8 to 20 feet. Our cotton lands are very retentive, and are easily worked when in proper condition; but they are much injured if worked when too wet, for then in dry weather they become very hard and difficult to manage. Properly handled, however, the most retentive soils work easily and withstand drought as well as if thoroughly underdrained. This peculiarity is due to the large proportion of fragmentary chert which is found intermixed with all the undersoils of this region. The chief crops are cotton, corn, wheat, oats, and clover, the uplands and second bottoms being best for cotton, wheat, and oats, and the second and first bottoms for corn and cotton. About one-third of the land is put in cotton.

DR. J. W. DAVIS, RUTHERFORD COUNTY (central limestone area): The region of Stewart's creek and lands thereabout, embracing a part of Stone's river, includes first and second bottoms and uplands. The upland soil is generally good. In the bottoms cotton is late and is sometimes injured by frost. After several years' cultivation, however, and in dry seasons, the bottoms make the heaviest crops. The soils cultivated in cotton are: (1) Brown upland, with red clay subsoil; (2) dark sandy land of Stewart's creek bottom above overflow; (3) light sandy bottoms of Stone's river. Of these the brown upland is the chief, making three-fourths of the whole. The extent of this soil is, across the streams, from 4 to 6 miles; with them, from 20 to 30 miles. Its growth is poplar, ash, walnut, oak, elm, sugar-tree, dogwood, and ironwood. Its depth ranges from 4 to 12 inches. Under the best lands the subsoil is a fine red clay, containing sometimes flinty gravel, and is underlaid by limestone at from 1 foot to 20 feet. The land is tilled with difficulty in wet weather, but easily in dry weather if not too dry. The chief crops are cotton, corn, oats, rye, wheat, and clover. The soil is best adapted to corn and cotton, though clover and wheat do well. From one-third to one-half is planted in cotton.

REV. M. F. THOMPSON AND B. F. RANSOM, BEDFORD COUNTY (central limestone area): The lands are those of Fall creek and the north fork of Duck river. They are in bodies of from 5 to 50 acres or more. The only circumstance of "local climate" influencing cotton growing is the shortness of the season, as the cotton is liable to be late and prematurely frost-bitten. The chief soil is the red upland, lying in level or rolling bodies, known as red land, and forms about one-fifth of the area of the region referred to. It extends 10 miles east and west, and as many miles north and south, and has a growth of hickory, dogwood, and walnut. It is a light clay loam with an average thickness of about 8 inches. The subsoil is a tough red clay, which bakes hard when exposed, but generally becomes by cultivation like the surface soil. It is not impervious, contains small angular gravel, and is underlaid by limestone at from 5 to 10 feet. In tilling qualities the soil is fair, and is early when well drained. Its chief crops are corn, grass, and wheat, being apparently best adapted to the first two. A small proportion of cotton is planted. The uplands are, however, variable, their bodies of cultivated soil alternating with "cedar roughs", or rocky, glady places. Bedford, as a whole, cannot be considered a cotton-growing area, all the cotton produced being raised in the northwestern quarter of the county. We have no cotton plantations proper. With the exception of one crop of 60 acres, I know of no other crop of over 20 acres. Two-thirds of the cotton raised is from patches of less than 5 acres.

J. B. EZZELL, MARSHALL COUNTY: The first and second bottoms and the generally level uplands of Spring creek and Duck river are the lands reported upon. The soils cultivated in cotton are brown and black upland soils, occurring mostly in fields of from 10 to 30 acres. Three-fourths of the lands in this region are of this kind, and extend 10 miles to the east, west, and south, and 4 miles north. The growth is red and black oak, ash, elm, and dogwood. The soils are a clay loam from 4 to 6 inches thick; the subsoils are gravelly. Limestone lies from 2 to 5 feet from the surface. The soils are very difficult to till in wet seasons, but easy in dry. Their crops are corn, oats, wheat, and cotton, but they are best suited to the first two. Cotton makes about 20 per cent. of the crops. There is very little difference in our upland soils.

E. H. THORNTON, WILSON COUNTY: The lands cultivated in cotton in Wilson are mostly on Hurricane, Sagg's, and Sinking creeks. Some is also raised near Laguardo, and on Barton's and Cedar creeks. None is raised in the eastern part of the county. The lowlands are creek bottoms, generally with a black loam soil; and some lands on the banks of the Cumberland river are sandy. The uplands consist of the lands of Poplar ridge, and also of red cedar lands in the southern part of the county. The season is hardly long enough for cotton



to mature, the greatest danger being the autumn frost. The soils cultivated in cotton are: (1) The poplar ridge lands (chiefly soils of the *Orthis* bed) in the middle part of the county; (2) the red cedar lands (of the central, glade, and Carter's Creek limestones) in the southern part of the county. These include all our cotton lands. The poplar ridge lands extend 10 miles in a northern and southern direction, and 20 miles in an eastern and western direction. The red cedar lands extend 12 miles in a northern and southern direction, and 10 or 12 miles east and west. The growth of the first kind is poplar, hickory, and oak; that of the second, oak, hickory, ash, and cedar, the latter chiefly in the glades. The crops produced are principally corn, oats, wheat, cotton, tobacco, and vegetables. The soil is apparently best adapted to corn and hay. The cotton planted forms about 4 per cent. of the crops.

**S. R. DOXEY, SUMNER COUNTY** (*Orthis* bed): Lands of the waters of Drake's creek and Cumberland river. The first and second bottoms are cultivated principally in corn. The uplands only are used for cotton. It will not open in the lowlands before frost. Soil No. 1 is about two weeks earlier than No. 2. The former is sandy and warm; the latter, more clayey, retains water longer, and is cooler. The soils are: (1) Yellow poplar land, lying on plains, ridges, and slopes; (2) dark loam, known as blue-grass land. There is but little of the yellow poplar land, which lies not far from the creek and river and runs along the north side of the latter in a strip for 5 miles or more. Its growth is poplar, gum, hickory, maple, ash, elm, walnut, some beech, dogwood, and ironwood. The soil is a fine sandy friable loam, brown and yellow, with a thickness of from 6 to 20 inches; the subsoil a deep yellow clay, containing more or less small gravel, underlaid by clay and rock at from 2 to 10 feet. It is not worked in wet weather, and is easily tilled in dry. The chief crops produced are cotton, corn, wheat, oats, potatoes, and grasses. In the particular region described the proportion of cotton planted is from one-fourth to one-half of all.

**B. GRAY, DAVIDSON COUNTY:** Hilly and level uplands of Hurricane creek, a tributary of Stone's river. The soils cultivated in cotton are: (1) Red clay lands, strongly calcareous, reaching from this point eastward and extensively into Rutherford county; (2) black loam, with yellowish clay subsoil, extending west, and also south into Williamson and north into Wilson county. The chief soils are the red clay lands. These are gently undulating, not hilly, and make about one-third of the lands in this region. The growth is poplar, oak, ash, some sugar-tree, elm, and hickory. These lands adjoin or alternate with "cedar glades". The soil is from 8 to 10 inches thick, and is early, warm, and naturally well drained. The chief crops are cotton, corn, and wheat, with also German millet for seed. Over one-half of the land is devoted to cotton, the lands appearing best adapted to this staple. The black loam, amounting to about two-thirds of the lands, extends north, south, and west for at least 15 miles. Its growth is poplar, oak, elm, ash, sugar-tree, beech, walnut, ironwood, dogwood, with here and there a patch of cedar on rocky places. The soil is from 8 to 12 inches thick, is easily tilled in dry weather, and is best adapted to corn. About one-sixth is planted in cotton.

**J. M. TURNER, EDGEFIELD JUNCTION, DAVIDSON COUNTY:** The first and second bottoms of the Cumberland river have a freestone (*Orthis* bed) soil, generally sandy, with, say, one-sixth part of a blackish mucky nature. These are the cotton soils: the first mahogany and gravelly, and the second sandy. The yellow mahogany is the chief soil, and forms three-fourths of the lands of this region. It extends northward about 15 miles, eastward 4 miles, southward 20 miles or more, and westward 4 miles. Its growth is elm, ash, poplar, hackberry, walnut, and sugar-tree. This soil has a depth of from 2 to 6 inches, a subsoil of yellow, heavy, stiff clay, often impervious to water, and is underlaid by limestone at from 1 foot to 20 feet. The land is easily tilled, and is early, warm, and well drained. It is not so well adapted to cotton as to other crops, though farmers raise more cotton than anything else, because it brings more ready money. About one-half is planted in cotton. The second or sandy soil forms about one-eighth of our lands, and has limited extent. Among its trees are sweet and black gum, oak, poplar, and beech. It is a fine sandy loam, 12 inches thick. The land is warm, easily tilled, and is best adapted to cotton, two-thirds of it being planted with this staple.

**JOHN S. CLAYBROOKE AND S. A. POINTER, WILLIAMSON COUNTY:** The lands of Aenon, Wilson's, and Harpeth creeks and the bottoms of Duck and Big Harpeth rivers are referred to. Duck River ridge, dividing the waters of Duck river from those of Big Harpeth, runs northeastward and southwestward through my place, "Wheatland." The uplands are rolling and level on the waters of the creeks mentioned. The shortness of the growing season forces us to put our best lands in cotton and work well, so as to push the plant and make it mature and open early. The writer has contended for many years that Williamson, Maury, and Giles counties afford, perhaps, the best cotton land in the south, and that, taking a number of years together, it would produce (not being subject to overflows, etc.) more to the acre than any section south of us. The cotton soils are: (1) Mulatto soil, on which grow white oak and white poplar, and, as we approach the hills, black soil with yellow poplar, large beech, and gum; (2) light sandy, white-oak soil, washing badly; (3) red soil (of Carter's Creek limestone) near and in the cedars. The chief one is the white poplar mulatto soil, embracing, while confined to Williamson and Maury counties, nearly all the lands for several miles on both sides of Duck and Big Harpeth rivers. In general, they extend from Brentwood to Mount Pleasant, an area of 50 miles in length and 10 miles in breadth. The mulatto soil is about 1 foot deep, with a clay foundation; the black from 1 foot to 3 feet, without clay foundation, the soil generally extending down to the rock. This is superior corn land. The mulatto and black soils contain but little gravel, and are underlaid by limestone at from 2 to 10 feet. We frequently cultivate from 8 to 10 acres to the hand. As to crops, wheat predominates; but cotton and corn are raised largely, with some barley and oats. The land is best adapted to cotton and wheat. About one-third of the land is put in cotton. The second kind of soil, the light sandy, occurs in small proportion in this region, and is met with for 6 or 7 miles east of the Columbia pike. A strip 30 miles long and 5 miles wide lies in the eastern part of Williamson and Maury. Much of this land is second rate, and produces little cotton. The third kind, red soil, near or in the cedars, occurs in large areas in the eastern parts of Maury and Williamson, and extends into Marshall and Rutherford counties. Like the last mentioned, much of it is second rate.

**W. O. GORDON, MAURY COUNTY:** The lands of the waters of Carter's creek embrace rich bottoms, second bottoms, rolling and hilly uplands, with respectively black, mulatto, and gravelly soils. The lands cultivated in cotton are: (1) The mulatto or poplar lands, supplying the best and surest yield; (2) the high gravelly hills or ridges, which are next preferred; (3) bottom lands, good if the fall is late, but not so reliable. The chief kind is the poplar uplands with mulatto soil. About one-third of the land is of this kind. They extend 30 miles northward and southward, but the best quality predominates from Ewell's southward to Mount Pleasant. It is a light sandy clay loam, about 9 inches deep, with a clay subsoil of stronger color, mixed more or less with gravel, and resting on rock at 4 feet. The soil is easily tilled in dry weather, and is early, warm, and well drained. It produces chiefly corn, wheat, and cotton; also oats, rye, and Irish and sweet potatoes, but is best suited to corn. About 30 per cent. of cotton is planted. Of the second kind, high gravelly lands, we have about 25 per cent., which lie on the tops and slopes of the highest ridges, the spurs of the highlands west of us, and the dividing ridges, like Elk ridge. The soil is gravelly, light, and loose, with gravelly subsoil. It is more easily tilled in wet weather, is early, warm, and well drained, and is best adapted to corn, cotton, and wheat. Allowing for roughness, these lands are the surest for the crops just mentioned. About 5 per cent. of cotton is planted, but more would be were it not for the rough hoeing. Of the third kind, bottom lands, we have about 40 per cent. They are best adapted to corn and hay. The cotton cultivated amounts to about 10 per cent. of the crops.

**L. E. POLK, MAURY COUNTY:** The lands referred to are the rolling and level uplands of the waters of Duck river. The soils cultivated in cotton are: (1) The yellow-poplar soil, or highlands, with chocolate-colored soil and yellow subsoil; (2) black sandy soil. The first is the chief soil, and 85 per cent. of the lands are of this kind. They have a wide extent within the basin of Middle

Tennessee. The growth is remarkable for its variety. Among the trees we have the large elm, oaks, poplar, sugar-tree, ash, beech in places, hickories, walnut, cherry, linden, box-elder, hackberry, and the black locust. The soil is a gravelly loam, alternating with a clay loam. The subsoil is gravelly, with good drainage capacity, and when exposed to the sun and air produces well. It is underlaid by limestone at from 6 to 20 feet. The soil is easily tilled in wet or dry seasons. The crops produced are corn, wheat, oats, and cotton, but the soil is apparently best adapted to corn and grass. About 15 per cent. of the tilled land is put in cotton. The second kind, the black sandy soil, making about 15 per cent. of the lands, alternates with the other over much of the basin. Its growth is much like that of the first, excepting that poplar is rarely seen. It is a deep soil in low places and branch bottoms with gravelly subsoil, which rests upon gravel and rock at from 2 to 6 feet from the surface. It is early, warm, and well drained. Cotton is cultivated upon 25 per cent. of this land.

LEON FRIERSON, MAURY COUNTY: First and second bottoms and rolling uplands of the Big Bigby river. The rolling land was originally rich brown loam, interspersed with black spots, but is now in many places much worn. We have, strictly speaking, no uplands, as this portion of the county lies within the Central Basin; so we use the term relatively. The soils cultivated in cotton are: (1) "Mulatto lands," or dark loam; (2) black porous soil, very loose (corn planted in it "frenches"); (3) gravelly soil, of which there is very little. The mulatto or dark loam lands are the chief, three-fourths being of this kind. The soil is from 12 to 18 inches thick, with a stiff clay subsoil, which changes to soil after it freezes and thaws. In some places the soil is mixed with coarse gravel. Limestone is met with at from 5 to 10 feet from the surface. The soil is best adapted to cotton and corn. One-third is planted in cotton. The second, the black, porous soil, forms a fourth of our lands. It is generally interspersed with the first all through this section of country, is 24 inches thick, and has a yellow, sticky clay for its subsoil, which is impervious to water if undisturbed. It contains gravel, and is underlaid by limestone at a depth of from 3 to 6 feet from the surface. This land is best adapted to wheat and oats. But little cotton is planted.

J. E. ABERNATHY, W. RIVERS, AND D. T. REYNOLDS, GILES COUNTY: These lands comprise the first and second bottoms and the rolling and hilly uplands of Big and Richland creeks. The uplands to a certain altitude are underlaid by limestone; above that by a flinty rock. All are rich and productive. Cotton in the lowlands is liable to be late and to be killed by frost, and is also more subject to rust. These lands, when fresh, with abundant vegetable matter and in favorable seasons, are very productive. We now prefer the uplands. The lands cultivated in cotton are: (1) Second bottoms above overflow; (2) uplands below the level of the flint formation; (3) uplands on the flint formation. The chief soil is that of the second bottoms, forming one-fourth of our soil and extending over a good part of the basin of Middle Tennessee. It is a mahogany colored clay loam with a hard clay subsoil, pulverizing readily. It is easily cultivated when well drained, is early and warm, and produces cotton, corn, and wheat, but is best adapted to corn, though all grow well. The cotton planted is about one-third of the crops. The second kind, uplands below the flints, comprise about one-third of the lands. These occur on the slopes of the ridges throughout the county, and are in native growth, color of soil, character of crops, and proportion of cotton planted much like the second bottoms. The third kind, the uplands on the flint, occur near and on the summits of the ridges throughout the county. Their timber is yellow and white poplar, beech, oaks, chestnut, hickory, ash, sassafras, and elm. It is a gravelly clay loam, but flint and gravel make it dark gray. Its subsoil is yellow clay, mixed with gravel. It is best for corn, though all crops grow well. Very little cotton is planted. Cultivation is more difficult than in the case of other lands, on account of the excess of coarse gravel present.

J. D. TILMAN, LINCOLN COUNTY: The first and second bottoms of Elk river are considered. Cotton is liable to be killed by frost. The lands cultivated in cotton are: (1) The alluvial bottoms of Elk river, containing sand; (2) uplands of mellow formation, breaking up without clods or lumps. The chief kinds are called "cotton lands", which form about one-twentieth of our tillable areas, and extend from the headwaters of the Elk river to its mouth. Their growth is hickory, oak, poplar, sycamore, black locust, and honey-locust. The soil is fine silt and sandy, gravelly loam of a brown or dark color, with a clay subsoil; sand, gravel, or limestone lie below at from 3 to 20 feet. This soil is easily tilled in dry weather, and produces corn, oats, clover, wheat, and cotton, but is best adapted to the first three. About one-twentieth of all the land planted is in cotton.

### THE CUMBERLAND TABLE-LAND.

Leaving the Central Basin, and crossing the eastern division of the Highland Rim, we reach the foot of the western escarpment of the Cumberland table-land, an elevated and sharply outlined division of the state. This is usually called Cumberland mountain, but it is better designated as table-land. It is, as already said, a plateau with broad and generally level top, standing in bold relief above the lowlands on each side, the rim lands on the west and the East Tennessee valley lands on the east rising up, in round numbers, 1,000 feet above these and 2,000 feet above the sea. It is the Tennessee coal-field, and embraces an area of 5,100 square miles—about one-eighth of the state. The form, relative size, and oblique northeasterly and southwesterly position of the table-land are seen upon the agricultural map, and is the portion marked 12a, and colored. (See also diagram.) Within its limits are included Scott, Morgan, and Cumberland counties, and the greater parts, severally, of Fentress, Van Buren, Grundy, Bledsoe, Sequatchie, and Marion, with considerable portions of Overton, Putnam, White, Warren, Coffee, and Franklin on the west, and of Claiborne, Campbell, Anderson, Rhea, and Hamilton on the east. The western edge of the division is notched and scalloped by deep coves and valleys, which are separated by finger-like spurs pointing westward, while its eastern edge is a nearly direct or gracefully curving line. At almost all points, on both sides, the surface suddenly breaks off in sandstone cliffs from 20 to 200 feet in height, giving everywhere a sharp and prominent margin or brow to the division. Commencing in the very body of the division, near the middle of the state, and extending southwestward into Alabama, the table-land is completely split longitudinally in two by the deep Sequatchie valley, a narrow, straight trough, 60 miles long, and averaging not more than 4 miles in width, if as much. Of the two arms thus formed, that to the west of the valley mentioned retains the name Cumberland, while that to the east is known as Walden's ridge.

The surface of the table-land is often flat for miles, with an open growth, mostly of oaks; then again it is rolling and diversified with hills and shallow valleys. In the northeastern part are high ridges, which may be regarded as mountains on the table-land. The division is very generally capped with sandstone, and shales are sometimes met with. The soils are thin, sandy, and porous, and are decidedly poor as compared with the limestone regions we have considered. In some sections they afford a pasturage of wild grasses. Apples and grapes often do well, and so do garden vegetables and Irish potatoes with plenty of manure. Here and there, on slopes at the foot of knobs

or ridges and along streams, more fertile areas are found, where land is cultivated, but in the aggregate farming operations on the table-land amount to very little. In general, the population is sparse, and wide regions without an inhabitant are traversed. The mountain, however, has attractions outside of its agricultural features which have drawn to certain localities many enterprising men, resulting in the building up of towns and intelligent communities. A very great accession is the establishment of the University of the South at Sewanee. By reference to the percentage map of acreage in cotton it will be seen that this division has no value as a cotton-producing area. Now and then little patches are seen in which some cotton is raised for domestic purposes, but the cotton reported in Table I as produced by this division was almost wholly raised on the lowland portions of the counties enumerated. Very little, in any case, is to be referred to the table-land proper.

We pass now from the sandy top of the table-land to the rich limestone declivities which make its sides. Below the great cap of the mountain—a cap made up of sandstones, shales, and coal-beds interstratified—there is everywhere a great limestone bed, known as “mountain limestone”, whose strata outcrop on all sides. The outcrops along the western side or slopes, which have more agricultural importance than the eastern, make at least two-thirds of the ascent from the base up. The surface is generally rocky, with very little soil. At intervals, however, bodies of land are met with which are rich and fertile. Not much of this land has been brought into cultivation, but now and then a small farm or a field shows itself as an open spot among the trees on the face of the ascent as one travels the lowland roads parallel with the mountain. The slopes are in the main covered with heavy forests, the trees, often of large size—poplar, black and white walnut, white oak, linden, mulberry, hackberry, species of ash, cherry-tree, together with the cucumber-tree, the great-leaf magnolia, papaw, and others—making a rich forest flora.

North of McMinnville a bench or terrace is very generally to be seen running along the slopes of the table-land and about half-way up. This comes from a thin sandstone, which in this region is interpolated in the series of mountain limestones. Immediately west of the main mountain and its outliers are many flat-topped ridges and “little mountains”, which have the same height as the benches, and are capped with the same sandstone. The flat summits of all of these have a rich, mellow soil, often sandy, upon which corn and wheat grow luxuriantly, and present favorite areas for orchards. Cotton, which is now occasionally seen in “patches”, would, in a more southern climate, do well upon them. We add that at the foot of the main mountain, as well as around the outliers, there is often much good land. This is especially true of the coves, some of which are noted for rich and beautiful farming areas. Going westward, these soils soon run into the red clay soils of the Highland Rim; in fact, they, as well as the soils of the steep mountain slopes, might have been considered consecutively after the red soils of the rim, since their underlying limestones belong to the same group, the sub-Carboniferous. In the southern part of the state cotton was formerly cultivated to a considerable extent in the coves and elsewhere along the base of the mountain, but now but little of it is raised. Below is an abstract from a report on lands in a mountain-hemmed valley, which may be regarded as a long cove in the table-land, having the same limestones as those referred to for its floor, and bearing the same relation to the mountain sides:

JOHN F. ANDERSON, FRANKLIN COUNTY: The district is bounded on the south by the Alabama line. The first and second bottoms of Crow creek, a tributary of the Tennessee river, are considered, together with the mountain slopes on each side of the Crow Creek valley. Occasionally cotton is injured by late northwest winds, and cold rains cause rust or “sore-shin”; but we are so protected by the mountains that such damage is rare. I consider this the best part of Franklin for cotton. All vegetables are two weeks earlier here than elsewhere in the county. The kinds of soil cultivated in cotton are: (1) Alluvial soils, differing greatly in character along the creek; (2) yellowish or reddish lands, sometimes black, based on limestone, and fertile; (3) mountain side, very rocky, soil thin, and not much cultivated. The chief lands are the alluvial or bottom lands. Two-thirds of the cultivated areas are of this kind, and extend along the valley for 12 or 14 miles with a width of from a fourth to half a mile. The growth is sycamore, willow, beech, sugar-tree, black walnut, ash, hackberry, elm, and linden. The soil is 24 to 30 inches deep. The subsoil is compact, coarse, gravelly, and rests upon limestone, the latter lying at from 2 to 24 feet below the surface. The land is usually tilled with little trouble, is early when well drained, and produces as chief crops corn and cotton; but it is best adapted to corn. One-fourth of the total acreage is put in cotton. The second kind of soil, the yellowish or reddish land, makes a third of our tillable areas, and extends through the valley in narrow strips outside of the alluvial lands. Its growth is cedar, white oak, beech, yellow poplar, hickory, black walnut, elm, linden, and hackberry. The subsoil contains much flinty gravel. The limestone lies below the surface at from 1 foot to 10 feet. The soil is easy to cultivate and produces well, and is best adapted to cotton, which forms about a fourth of the crops. The lands of the mountain sides are fully equal in area to the tillable lands below. The growth is made up of a great variety of timber. It is best adapted to corn, vegetables, and fruits. No cotton is raised upon it. The lands on the top of the mountain are good for tobacco, Irish potatoes, and fruit of all kinds.

### THE VALLEY OF EAST TENNESSEE.

Passing in our course eastward the Cumberland table-land, with its flat areas, oak woods, and sandy soils, we find ourselves in the great and populous valley of East Tennessee, with its diversified rocks, soil, and scenery. (a) This division has been briefly characterized on a former page. Within it is embraced nearly all the

<sup>a</sup> It may be noted that the Cumberland table-land, rising so boldly above the general level of the state, separates two of the great sections of Tennessee—sections great in area, wealth, and population: the Central Basin, with the best of the rim uplands around it, on the west, and the valley of East Tennessee on the east. The comparatively barren table-land has always been a serious obstacle in the way of free intercourse between these sections. Even now no railroad crosses it within the state. To pass from Nashville to Knoxville it is necessary to make a great detour to the south through Alabama.

agricultural wealth which is usually accredited to the civil division we call East Tennessee. Its oblique position relative to the northern and southern boundaries of the state and its shape are seen in the cut on page 11, as well as on the agricultural map. Its area extends through the state from Virginia to Georgia, and is included between the Cumberland table-land on the west and the Unaka mountains on the east or southeast, its lateral limits being clearly defined by these mountains. (a) It includes the following counties and parts of counties: The whole of James, Bradley, McMinn, Meigs, Loudon, Roane, Knox, Jefferson, Union, Grainger, Hamblen, Hancock, Hawkins, Washington, and Sullivan, parts of Marion, Sequatchie, Bledsoe, Hamilton, Rhea, Anderson, Campbell, and Claiborne (the other parts of these being on the table-land), and parts of Polk, Monroe, Blount, Sevier, Cocke, Greene, Unicoi, Carter, and Johnson (the remaining portions of the latter making up the area of the Unakas). Measured directly across in the northern part of the state, the area is 55 miles wide or thereabout. Toward the south the mountain barriers approach each other, and the width is reduced approximately to 34 miles, not including the outlier, Sequatchie valley. As seen from the high points of the Unaka mountains the valley of East Tennessee presents a wide-spreading floor—a vast, nearly level plain, limited on the west in the distance by the wall-like eastern escarpment of the Cumberland, and having but a few isolated ridges, like long narrow islands, projecting above the general surface. But when we descend from the mountains and travel across this floor it is anything but a level plain, the whole becoming an area fluted with a multitude of smaller valleys and ridges—a furrowed field on a Titanic scale. The valleys and ridges are crowded together, and extend in parallel lines to the northeast and southwest, the prevailing directions in the valley of East Tennessee. The smaller streams take, in the main, either the one or the other course. The rivers flow to the southwest, or, in the case of those from North Carolina, make their way across the country by the shortest routes through gaps and breaks of the ridges to those that flow to the southwest. The railroads and other chief lines of travel and commerce run with the valleys. This northeasterly and southwesterly striation, if I may use the word, of the great valley, so far as its natural and many of its artificial characteristics are concerned, is strikingly seen on the geological and topographical as well as agricultural maps of the state. This is all due primarily to the fact that the rocky strata are greatly inclined or tilted so that their edges outcrop along the surface, which they do in northeasterly and southwesterly lines. Thus the rocks present themselves at the surface in long, narrow, parallel strips or belts with the trend indicated. The hard strata-like sandstones and cherty dolomites make the ridges; the soft, like limestones and shales, the valleys. The several soils of the valleys and ridges necessarily occur in strips as represented on the agricultural map. Some of the valleys, or valley ranges, though averaging hardly a mile in width, may be traced, or indeed traveled in, from Virginia to Georgia, a distance of 150 miles, to say nothing of their extension either way beyond the limits of the state. Certain ridges, straight or slightly curving, are equally long, and most of them may be followed for scores of miles. Some ridges are narrow and sharp, like a steep roof; others are wide, broadly rounded on top, and of far greater importance, of which Copper, Chestnut, and Missionary ridges are types. These are dolomite ridges, and their surfaces are strewn with cherty masses and gravel. The ridge upon which Knoxville is built is one of the latter, a range originating in the northern part of Knox county and traceable into the state of Georgia. Ridges of this type occasionally flatten out, giving us plateau areas of great agricultural value, such, for example, as the body of land traversed by the East Tennessee and Virginia railroad in Jefferson and Hamblen counties, or break up more or less into wide belts of cherty knobs, as those in Hamilton and Rhea, between the Tennessee river and the Cincinnati railroad, or those in Hamilton and James east of Missionary ridge, and crossed by the Chattanooga and Cleveland railroad. But these cherty dolomite knobs are not the only ones. The kinds of knobs characterizing the two areas designated respectively as the “red belt” (7c) and the “gray belt” (8c) on the map differ materially from those mentioned, and differ in a degree from each other. The *red belt* begins in Jefferson county, has its greatest width in Knox and Blount, and continues southwestward through other counties to the Georgia state line. (See map.) This area is remarkable for its long lines of red knobs and red lands. With the lines of knobs are intervening broken valleys. The soils are based upon calcareous shales, with which are interstratified very ferruginous sandy limestones, flaggy limestones, and red marbles. They are often very mellow and fertile, as upon the slopes of the knobs. The *gray belt*, so named from the prevalence of gray lands and earthy gray rocks, lies further to the eastward. It is a great club-shaped area commencing on the Virginia line and extending southwestward to the Hiwassee river, reaching, indeed, nearly through the state. (See map.) Its characteristic feature is found in its isolated and often crowded knobs, which beset the surface like monster ant-hills. Many portions of the belt are spoken of locally as “the knobs”. These are conical hills of all heights, from 100 to 500 feet, and sometimes they are more or less elongated, forming short ridges; and in some regions, where closely set, they make a wild country traversed by narrow labyrinthine valleys. The formation of the area is a heavy body of sky-blue, calcareous, and often sandy shales, weathering to yellowish-gray or buff, and containing occasionally thin

a I include in this division, as outliers, the interesting valleys and coves which are more or less interlocked with the ridges of the mountains on each side. One of these, Sequatchie valley, splitting the southern portion of the table-land, has been spoken of. On the eastern side there are many, some of them noted for the attractiveness of their natural features. The cultivated part of one county, Johnson, in the northeastern part of the state, is a mountain-hemmed cove, with no way of getting in or out except by scaling mountains or by passing through dark and rocky water-gaps. Other interesting coves are Wear's, in Sevier county, and Tuckaleechee and Cade's, in Blount county.

flaggy limestones, and at some points thin sandstones. The belt often possesses a dark rich soil, supporting a growth of white oak, poplar, and hickory, and some portions abound in small farms between the knobs and on their slopes. In such regions we have what has been called "the poor man's rich land".

If we draw a line from Virginia to Georgia lengthwise through the middle of the great valley, splitting it into halves, the knobby belts we have just described will lie in the eastern or southeastern half. Besides these, there are in this part many ridges and valleys based on other rocks. It is, however, in the other half of the valley, on the northwestern side of the median line, that we have the most characteristic display of the wonderfully long, yet narrow, parallel, and alternating valleys and ridges. The length of these has already been referred to. I add a word more as to the valleys. These are troughs between the ridges, and are wide or narrow in proportion to the separation of the latter. They vary in width from the fraction of a mile to 1 mile or 2 miles, not often more than this, and most of them are attractive and fertile. Some of the narrow ones are cold and unproductive. There are two principal classes, as will be hereafter noticed, the limestone valleys and the shale valleys, and both kinds in general are amply watered by streams abundantly supplied with free-flowing springs, well populated, abounding in arable fields. Each valley is a kingdom in itself, communities being separated from each other by the intervening ridges. Most of the population live in the valleys, though houses and farms are occasionally seen upon some of the ridges of the Copper Ridge type. For the most part, the ridges are the wooded portions of the country. Seen from a distance, they are marked out by lines of forests crowning the summits, which heighten the contrast between ridge and valley. The fields of the valleys often creep a long way up the slopes to the line of the trees.

For present purposes enough has been said as to the general character of the valley of East Tennessee. To go into detail, enumerating and describing all its numerous and varied features of structure and surface, would carry us far beyond reasonable limits.<sup>(a)</sup> Such detail can be dispensed with the better since the valley is not a cotton region proper. It belongs at most to the *penumbral region* of cotton culture. The whole yield reported for the census year, including also the little cotton raised in the mountain parts of such of its counties as reach out, respectively, upon the table-land and the Unakas, is only 537 bales, and of this more than 400 bales were raised in the valley portions of counties south of the latitude of Knoxville. (See percentage map of cotton culture.) In nearly all the counties quarter-acre or half-acre patches are occasionally met with, in which a little cotton is cultivated for home use.

The soils indicated upon the map and named in the legend have in part been noticed. The "*red belt*" (7c) and the "*gray belt*" (8c) have been sufficiently spoken of. The "*limestone lands of certain valleys in East Tennessee*" (8b) make some of the best agricultural belts of the division. They have blue limestone soils, the equivalents of the soils in the Central Basin, and nearly all the important valley ranges on the western or northwestern side of the median line of the division have these soils. Such are the valleys known as Powell's, Beaver creek, Raccoon, Hickory, Savannah, and others. They make the long valley ranges to which attention has been called, and are everywhere in cultivation and dotted with farm-houses. Toward the south, and before reaching the Georgia line, most of these valleys are pinched out, giving way to shale valley ranges or to ridges. On the east or southeast side of the median line there are very few of these, and they are unimportant. The "*calcareous shale and valley lands*" (9a) belong to a group of valleys equal in importance to those just mentioned. The rocks which supply the soils are variegated, chestnut-colored, greenish and buff shales, generally calcareous, and show now and then an interstratified layer of dolomite or limestone. This series is called the *Knox shale*. Many of the valleys are very desirable agricultural belts. In the southern part of the division especially a number of them are wide, gently rolling or level, and afford tracts of highly fertile land, often in a good state of cultivation. It is one of the important soils upon which cotton is cultivated. The soils are clayey, but are mellowed by the *débris* of thin sandy layers and by calcareous matter. On the west side of the median line the shale valleys, or valley ranges, when followed northeastward up the country, become very much narrowed, losing their importance. This is also the case to some extent on the eastern side of the valley. The "*magnesian limestone lands*" (10a) are those of level or rolling plateau belts, or of moderate slopes based on dolomites, and such as that above-mentioned traversed by the railroad in Jefferson and Hamblen counties. There are but few of these areas, and these are chiefly in the upper end of the valley. These soils are strong and fertile, and under cultivation. The subsoils are deep yellowish or reddish, and contain cherty gravel and masses of chert. These areas I have spoken of as dolomite ridges flattened out into plateau land. The "*ridge and cherty lands*" (10b) are those of many wide and rounded dolomite ridges in the valley, of which Copper, Chestnut, and Missionary ridges, before mentioned, are good examples. In these the rocky strata are usually concealed by a great depth of clayey, reddish subsoil, in which there is much chert and cherty gravel intermixed. The surface of the ridges is often so covered with flinty gravel as to supply natural macadam road-beds, over which it is pleasant to drive. The wooded summits, the encroachments of the cultivated fields upon the slopes, and the presence occasionally of houses and farms upon the ridges, have been referred to. In regard to alluvial lands, bottoms occur at intervals along the streams, there being noted ones on the French Broad, the Holston, Tennessee, and other rivers. The aggregate of such land, however, though very considerable, is limited in this division as compared with what we have in the western part of the state.

<sup>a</sup> For further information as to the physical and agricultural features of this division, see the writer's *Geology of Tennessee*.



Sequatchie valley is the most important outlier of the valley of East Tennessee. Its relation to the Cumberland table-land or mountain has been given in Part I under the head of that division. As there stated, it is a narrow, straight trough, 60 miles long, with an average width of not more than 4 miles, and lies compressed between the steep and parallel walls or edges of the table-land, which rise on both sides to an elevation of 1,000 feet and overshadow its area. Looking from these heights down upon the valley below, we see first a central, depressed, wide, and wooded ridge, running as far as the eye can reach lengthwise through the valley, and constituting the greater part of its surface, and then two cultivated valleys, one on each side of the ridge, between it and the foot of the mountain slopes. The rocks of the central ridge are dolomites, like those of Copper and Chestnut ridges in the main valley to the east, to which class of ridges it belongs, the cherty lands, native growth, etc., being similar. The valleys have strong soils based on blue limestones, and give a large aggregate of good farming lands. That on the eastern side, in its rocks and soils, is to be referred to the class of valleys, including Powell's, Beaver creek, Raccoon, and others, before mentioned. That on the west side has frequently more cherty limestones (mountain or Saint Louis) for its underlying rocks. The Tennessee river, breaking through the eastern arm of the mountain, enters the southern end of the valley and then flows in the extended course of the latter far into Alabama. Sequatchie river runs through the whole length of the valley, winding along for the most part, very curiously, in the ridge area, breaking up the latter here and there into hills and knobs.

But three reports have been received from counties in the valley of East Tennessee, abstracts of which are given in Part II, on page 92. As to the first, it may be noted that Chickamauga is near the Georgia line. Dolomite cherty ranges, as well as a valley of the Knox shales, pass through this region.

#### THE UNAKA MOUNTAIN REGION.

We have now reached the last of the eight natural divisions of Tennessee, the *Unaka Mountain region*. The general character of the division, its position, elevation, and area, are briefly given on page 14. It embraces the mountainous parts of Polk, Monroe, Blount, Sevier, Cocke, Greene, Unicoi, Carter, and Johnson counties. Including interlocked valleys and coves, the region is a long belt, with a width of about 13 miles, lying contiguous to the state of North Carolina, and reaching from Virginia to Georgia. (See 13 on the agricultural map.) It gives to the eastern end of Tennessee a greatly raised, cloud-capped border, strikingly in contrast with the low and often flooded plains of the western end. The included valleys and coves having been referred to and treated as outliers of the division last described, we are concerned here mainly with the mountains proper. The great ridges embraced in the division, and often named the Unakas, are arranged approximately in two principal chains, which are more or less crowded together in parallel lines. The chains are not continuous. The main one, the axis of the group (of which Catface mountain, the Yellow, the Roan, the various "Balds", the Great Smoky, and the Frog are some of the prominent points), is cut directly across by rivers, seven in number, which flow from the western slope of the Blue Ridge in North Carolina northwestward into Tennessee, passing the great axis in deep and magnificent water-gaps. The most westerly chain, of less average height (to which belong Star's, Chilhowee, English's, Meadow Creek, Holston, and other mountains), was elevated by the original geological forces in detached ridges, often many miles apart, but arranged lengthwise, end facing end. Nevertheless, some of the isolated mountains—Star's and Chilhowee, for example—are cut in two by water-gaps. The portion of the main axis between the French Broad and Little Tennessee presents in its length of 65 miles a series of peaks but a few feet lower than the highest of the Black mountains in North Carolina. Many of these exceed 6,000 feet. Altogether, we have here without exception the boldest and greatest mountain mass to be found anywhere east of the Mississippi river, known as the Great Smoky. Farther to the northeast, in the section between the Watauga and Nolichucky, are several great ridges, among which we may mention the Roan. This, though not having the highest peaks, is in some respects the grandest mountain of the Unakas. Its summit, presenting a number of peaks more than 6,000 feet high, is in many places destitute of trees, owing to the low temperature of the heights. These are called "balds". On the Roan there is a succession of them, giving the broad summit at intervals a meadow-like aspect. Such places we have seen in the summer time alive with stock of all kinds, feeding and fattening upon the rich herbage. The "balds" are not confined to the Roan, but occur at many points along the summits of the main Unakas. As a rule, the ridges are clothed with forests. When, however, a height of about 5,000 feet above tide is reached, the deciduous trees—beeches, oaks, and maples—become more or less dwarfed, and often in ascending farther entirely disappear, the summit then becoming a "bald". Some of the highest points, instead of being bald, are dark, with a heavy balsam and evergreen growth.

The rocks of the Unakas are micaceous and hornblendic gneisses, granites, slates, semi-metamorphic conglomerates, and sandstones, the strata of which are upturned and dip at high angles. The ridges are cold, steep, and rocky, and, in the main, have thin, sandy soils. Nevertheless, on the tops of the highest ridges are tracts, like those of the "balds", prairie-like, black, and rich. Places of considerable fertility are rarely met with on wooded slopes supporting a growth of walnut, beech, poplar, wild cherry, and the like, but at long intervals a cleared spot may be discerned. The mountains proper can hardly be said to be inhabited, and it is rare to meet with a true mountaineer. The chief settlements are below in the valleys and coves. Occasionally, cabins and small

cultivated fields may be found along a stream in a depression of the high mountains. But we have already dwelt longer than necessary upon the characteristics of this division. As a section for the growing of cotton it has no interest. Of that reported in Table II as the product of certain counties partly pertaining to the division perhaps not as much as a bale was raised upon the Unaka ridges proper. The mountains, so far as utilized, have been in the main grazing grounds for cattle.

### REMARKS ON COTTON ACREAGE AND PRODUCTION IN TENNESSEE.

An inspection of the map of relative acreage, as well as of the tables, shows at first glance that the cotton-producing areas of Tennessee lie substantially in the western half of the state. It is also seen that there are two chief regions of production, the one mostly within the great plateau slope of West Tennessee, and the other in the Central Basin; and furthermore that these regions are united by an area of low production lying within the limits of the highlands, in the western part of Middle Tennessee. The western chief region is much the more important of the two. Its area of greatest acreage in cotton, and the greatest occurring in Tennessee (15 per cent. and above), lies in the southwestern corner of the state. Passing from this outward, northerly to Kentucky or easterly toward the highlands before referred to, areas of less and less acreage are successively crossed. The eastern chief region, that in the basin, has no one center of greatest acreage. The highest reached is 10 to 15 per cent., and this is found in detached belts or sections in different parts of the basin inclosed by areas of lower acreage. We add that as in going northward the cotton product diminishes the tobacco product, in general, takes its place and increases.

It is to be noted that the northern edge of the cotton-producing portion of Tennessee and of a small strip of western Kentucky between the Mississippi and Tennessee rivers is, for the inland section east of the Mississippi river, the extreme northern limit of the cotton region of the south. (a)

The chief circumstance which determines this limit is the low temperature of the climate, or, as we may put it, the shortness of the growing season; that is to say, the season between frosts. This matter has already been discussed in this report (page 13). It is there shown that the isotherms, or lines of equal heat, of spring and fall for the non-mountainous parts extend diagonally through the state, or, say, parallel to a line running from its southeastern to its northwestern corner. In accordance therewith, the limit of the cotton region, as seen in Tennessee and Kentucky, is approximately parallel to such a line, or would be, excepting that at one point the exceptionally warm and mellow lands of the Central Basin prevail and carry the limit beyond the normal line. And further, in harmony with the direction of the isotherms, the extreme southwestern corner of the state is the warmest and has the longest growing season, and here we have the area of greatest production. Cultivators of cotton in all parts of the state, even in the warmest portion just referred to, fear the late frosts of spring and the first killing frosts of autumn, and are often driven from the rich but colder alluvial bottoms to the warmer, early-maturing uplands.

TABLE III.—POPULATION AND COTTON PRODUCTION IN EACH AGRICULTURAL REGION IN THE STATE.

Agricultural regions, arranged according to product per acre.	Land area.	POPULATION.			COTTON PRODUCTION.											
		Total.	White.	Colored.	Acres.	Bales.	Product per acre.				Total in tons.		Percentage of state's total production.	Cotton acreage per square mile.	Bales per square mile.	
							Bale.	Seed-cotton.	Lint.	Seed.	Lint.	Seed.				
	Sq. mls.							Lbs.	Lbs.	Lbs.						
The State.....	41,750	1,542,359	1,138,881	403,528	722,562	330,621	0.46	651	217	434	78,522	157,044	100.0	17.3	7.0	
Lake county (Mississippi river alluvium).	210	3,968	3,274	694	3,249	2,412	0.74	1,059	353	706	578	1,146	0.7	15.5	11.4	
Mississippi river alluvial and bluff region.	2,340	152,411	84,118	68,293	177,028	93,842	0.59	756	252	504	22,287	44,574	28.4	60.7	30.0	
Brown loam table-lands * .....	6,200	261,997	162,278	99,719	386,269	171,534	0.44	621	207	414	40,730	81,478	51.0	32.3	27.7	
Western valley of Tennessee river.	2,910	68,609	58,935	9,674	24,033	9,620	0.40	570	190	380	2,285	4,570	2.9	8.3	3.3	
Highland Rim .....	8,200	225,828	135,945	89,883	9,700	3,843	0.41	582	194	388	913	1,826	1.2	1.2	0.5	
Central Basin .....	6,190	387,151	252,461	134,690	120,729	48,778	0.40	576	192	384	11,585	23,170	14.7	10.5	7.9	
Cumberland table-lands † .....	2,970	29,181	27,966	1,215	133	55	0.41	588	196	392	13	26	.....	.....	.....	
East Tennessee .....	12,530	413,214	363,834	49,360	1,421	537	0.35	552	184	368	127	254	0.2	0.1	.....	

\* Including summit region of water-shed.

† Cotton produced mostly on rim lands or valley lands of the table-lands proper.

a We do not regard the penumbral regions of cotton culture in Tennessee and Kentucky. What we find there only proves that under unusually favorable circumstances, or in special cases, cotton may be cultivated out of its proper domain, within which only fair and constant mean results are attainable.



MAP  
OF  
KENTUCKY & TENNESSEE

SHOWING  
IN THE DIFFERENT SECTIONS OF THE STATE  
THE RELATION BETWEEN THE  
AREA CULTIVATED IN COTTON  
AND THE TOTAL AREA

BY  
JAMES M. SAFFORD, PH. D. M. D.  
SPECIAL AGENT

1883.

LEGEND.

Percentage of total area  
planted in Cotton in 1880.

- I 0 to 1  
II 1 to 5  
III 5 to 10  
IV 10 to 15  
V 15 to 20  
VI 20 percent and above.

Scale  
0 10 20 MILES

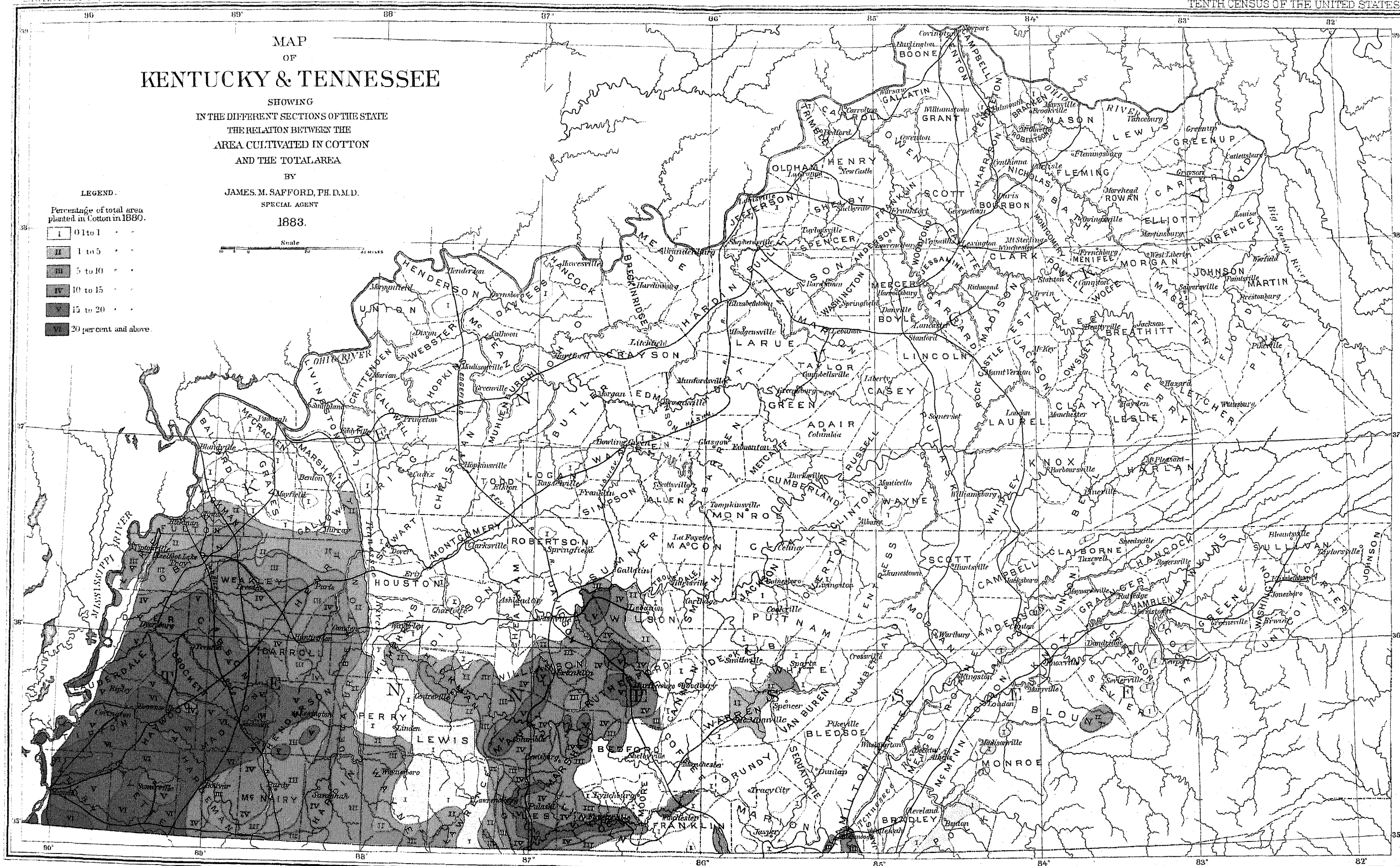


TABLE IV.—BANNER COUNTIES, AS REGARDS TOTAL PRODUCTION AND PRODUCT PER ACRE, IN EACH AGRICULTURAL REGION.

Regions according to product per acre.	Average product per acre.	COUNTY HAVING HIGHEST TOTAL PRODUCTION.					COUNTY HAVING HIGHEST PRODUCT PER ACRE.					
		Name.	Rank in product per acre in state.	Acres.	Bales.	Product per acre.	Name.	Rank in production in state.	Acres.	Bales.	Product per acre.	Rank in product per acre in state.*
Lake county (Mississippi river alluvium) .....	<i>Bale.</i> 0.74	Lake .....	1	3,240	2,412	0.74	Lake .....	23	3,240	2,412	0.74	1
Mississippi river alluvial and bluff region .....	0.53	Shelby .....	8	92,020	46,388	0.50	{Dyer .....	16	14,637	8,564	0.59	2
							{Obion .....	21	7,250	4,225	0.58	3
Brown-loam table-lands † .....	0.44	Fayette .....	13	92,231	30,221	0.43	{Crockett .....	14	17,807	9,320	0.52	6
							{Gibson .....	5	30,820	19,272	0.52	7
Cumberland table-lands † .....	0.41	Van Buren .....		88	20	0.33	Scott .....	60	3	2	0.67	.....
Western valley of Tennessee river .....	0.40	Hardin .....	23	12,859	5,845	0.42	Humphreys .....	40	155	90	0.58	.....
Highland Rim .....	0.40	Hickman .....	22	3,128	1,302	0.42	Montgomery .....	60	2	2	1.00	.....
Central Basin .....	0.40	Giles .....	12	31,416	13,802	0.44	Trousdale .....	75	1	1	1.00	.....
East Tennessee .....	0.38	Hamilton .....	38	486	143	0.29	Hawkins .....	74	2	2	1.00	.....

\* Omitting those whose production is less than 100 bales.

† Including summit region of water-shed.

‡ Cotton produced mostly on rim lands or valley lands of the table-lands proper.

County in the state having highest total production, Shelby, 46,388 bales. County in the state having highest product per acre, Lake, 1,059 pounds of seed-cotton. County in the state having highest cotton acreage per square mile, Fayette, 144 acres. County in the state having highest percentage of tilled land in cotton, Shelby, 47.3 per cent.

In the tables the aggregate number of bales produced in each natural division is approximately given. Many counties have portions in two contiguous divisions, which circumstance has caused more or less embarrassment in the attempt to classify the counties with reference to the divisions. For this reason the aggregates are approximations only. The defect, however, has been rectified to a considerable extent in the descriptions of the divisions given in the report. The map of relative acreage also will serve as a check in this direction.

The *Mississippi bottom region*, the smallest of our natural divisions, has the distinction of containing lands which produce the most cotton to the acre. This, however, is only an inference based on general information, as, throwing out Lake county, which is wholly within the bottom, the data were not at hand necessary for the separation of the products of the bottoms from those of the uplands. Lake county reports less than 10 per cent. of its tilled land in cotton, which is much below the average of the river lands south of this county. The yield per acre in Lake was 0.74 of a bale of 475 pounds, the greatest yield recorded for any county.

The great *plateau-slope region of West Tennessee* stands pre-eminent within the state in cotton culture, its great expanse of level or gently undulating brown loams, together with the warmer climate, giving it this position. Its first subdivision (*a*) on the west, the bluff region, had in 1879 a fraction less than 33 per cent. of its tilled lands in cotton. The yield per acre was 0.53 of a 475-pound bale, the highest rate attained, excepting that for the single county of Lake. The latter result is doubtless attributable in part to the character of the plateau areas of fine siliceous and limy loess soils of the subdivision. The Mississippi lands within these counties may help to exalt the rate, but they are too limited, comparatively, to affect it materially. The second subdivision (*b*), the brown-loam table-lands, the largest subdivision of the plateau slope, had also a fraction less than 33 per cent. of its tilled lands in cotton, but its rate of yield per acre was less, being 0.45 of a 475-pound bale. If on the acreage map the color area of highest percentage of total area, a section lying in the southern parts of the two subdivisions (*a* and *b*), alone be taken, the percentage of tilled land in cotton was 41.5, the greatest proportion in this particular that has been reached, and the rate per acre 0.47 of the standard bale of 475 pounds. In the third subdivision, the summit region of the water-shed (*c*), there is a material falling off in the proportion of tilled land in cotton, it being 19.4 per cent. The yield per acre was 0.42 of the standard bale.

In the *western valley of the Tennessee river* the percentage of cotton production, as seen on the acreage map, is much reduced, especially in the northern part of the state. On the eastern side of the Tennessee, north of Duck river, it is, excepting a spot in Stewart county, practically nothing. Within the cotton-producing portion of this valley the percentage of tilled land in cotton was not quite 7 per cent. The yield per acre was 0.40 of a bale.

Next follows the *western subdivision of the great Highland Rim*. This high "barreny" belt of country, with areas of lowest production alternating, could they be shown, with areas of non-production, lies between the two chief regions of cotton culture, and almost makes a break in the continuity of the cotton-belt as a whole. What cotton is put to its credit was mostly raised in the deep valleys intersecting the belt.

The *Central Basin* as a cotton-producing area rates pretty well in the number of bales and in the percentage of the total acreage with that part of West Tennessee, nearly half, which embraces, with Benton, the two northern tiers of counties. Including as a part of the basin area the valley of Duck river, in Hickman, the West Tennessee fraction had the better of it by about 1,000 bales. In the basin, as a whole, the proportion of tilled lands in cotton was 6.4 per cent.; in a number of the northern counties, however, little or no cotton was planted, tobacco taking its place. If the non-cotton counties and parts of counties could be thrown out the proportion of tilled land in cotton would be much greater. For Giles county, as the case stands, it is 18 per cent.; for Rutherford, 16; for Maury, 10; for Williamson, 7. The yield per acre for the cotton area proper of the basin is 0.40 of a 475-pound bale. Giles goes above this, the yield being 0.44 of a bale. Rutherford and Williamson fall to 0.38 of a bale. It is not clear, from a study of the column of "bales per acre" in Table I, that there is any relation between the figures there given for the counties of the basin and the capacities of the soils concerned, though in the case of Giles the rate would appear to be significant.

East of the basin the two mountainous divisions, the *Cumberland table-land* and the *Unaka Mountain region*, are non-producing as to cotton. The remainder of this part of the state, the *eastern subdivision of the Highland Rim* and the *valley of East Tennessee*, is in the penumbral region of cotton-growing. It would appear that the culture of cotton in the valley of East Tennessee had been advancing to some extent northward for a few years previous to 1880.

RELATIONS OF COTTON PRODUCTION TO THE RACES.—As to the relations of whites and negroes to cotton culture and production, Table I authorizes the broad statement that where the greatest aggregate of cotton is produced there is, other things being equal, the greatest negro population; and, further, that as the one decreases in the several belts the other does also, though not necessarily at the same rate. Take, for example, the group of six counties in West Tennessee (Shelby, Fayette, Hardeman, Tipton, Haywood, and Madison), producing the most cotton and embracing on the acreage map the color area of the greatest acreage in cotton (15 per cent. and above), and we find that they contain nearly one-third (30 per cent.) of the entire negro population of the state, although their aggregate area is a little less than one-twelfth (about 8 per cent.) of the area of the state. And it makes little difference in this estimate if Shelby, with Memphis, be thrown out of the calculation. In this same group of counties the negro population is 57 per cent. of the total population. Similar calculations as to the production and population of the other color areas on the acreage map, especially in West Tennessee, will bear out, in general, both statements made. In the Central Basin the relations cannot be made so apparent, chiefly because the color areas are small and broken and the data are not at hand for making out the negro population of each separately. A real aberration, however, in the force of the statement is caused by the fact that some of the very rich counties, either in whole or in part, especially in the northern portion of the basin, find profitable employment for negro labor other than in the raising of cotton. Another circumstance to be considered, both as to West and to Middle Tennessee, is the presence of large and prosperous towns or cities in which negroes congregate, and which cannot always be eliminated in the calculations. We add that the negro population of the cotton region as a whole is approximately 68 per cent. of the entire negro population of the state, while its area is only about 48 per cent. of that of the state.

It must also be stated that while the greatest number of negroes are found in areas of greatest aggregate production, yet it does not follow that in such areas the most cotton is produced per acre. In the six counties referred to, in the southwestern corner of the state, we have, area for area, the most cotton produced and the highest percentage of negro population, with an average yield per acre of 0.46½ of a 475-pound bale, while in another group of counties in the northwestern corner of the state (Lake, Obion, Dyer, Lauderdale, Gibson, and Crockett), where the relative production and percentages of negro population are much less, we have an average yield per acre of 0.58½ of the standard bale—a wide difference. This is in the case before us due much, but not altogether, to the differences in the qualities of the soils concerned. How far the kind of labor as to race enters as a factor in such results is a question for consideration.

METHODS OF COTTON CULTURE.—A few general notes are appended as to the agricultural methods employed in the cultivation of cotton within the state.

Fallowing is practiced in all the divisions, but only to a limited extent, and rarely in the alluvial region of the Mississippi. Land lying fallow within the area of the plateau slope of West Tennessee and of the western valley of the Tennessee river is sometimes tilled, sometimes only turned out. Weeds are often turned under and the land sown in field-pease, or in grain in place of pease, or sometimes in clover or grass. In the Central Basin the land is in a majority of cases only turned out; sometimes sown in clover, grass, or wheat. The results in both cases are generally reported as good.

Rotation of crops is generally practiced, but with little system. Cotton, corn and wheat, or corn, cotton and wheat, are made to follow each other in courses of three to four and five years. In the place of wheat, oats or clover, or sometimes pease, sweet potatoes, or even in certain counties peanuts, are substituted. On strong land the courses are sometimes reduced to two years, cotton and corn alternating, wheat or oats occasionally taking the place of the latter. It is the rule perhaps to change yearly, but there are many exceptions to this, the same crop, as cotton or corn, being raised on the same land for a series of years, covering sometimes a period of five or even ten or more years. The general testimony is, as we might have anticipated, that rotation relieves the land and is of material benefit.

Fall plowing is done to a greater or less extent in all parts of the cotton region, more generally in the Mississippi bottom and the bluff region and in the Central Basin, and less so within the limits of the brown-loam table-lands of West Tennessee. It is often done for wheat alone, and the results are very generally reported as good. Subsoil plowing amounts to but little in any of the divisions. When done, a bull-tongue is generally run in the furrow after a turning-plow.

Outside of a scanty supply of stable manure the fertilizers used amount to but little. Land plaster to a small extent and less guano are applied in the midland counties of West Tennessee. Some plaster is likewise used in the Central Basin, together with a limited amount of manufactured fertilizers. Cotton-seed, especially away from cottonseed-oil mills, is thus in part disposed of. In addition, compost material, straw, cornstalks, ashes, etc., are utilized by provident cultivators. The lands are further often improved by the plowing under of clover, pease, and weeds. The cotton lands of Tennessee are in the main still quite productive as compared with many sections in other states, and there does not exist the same necessity for the use of fertilizers; nevertheless there are areas with us which would be greatly benefited by a judicious application of artificial or other fertilizers, and which, in truth, need them if good crops are to be expected.

Cotton-seed, in addition to its use as manure, is largely employed as a food for cattle, especially in regions remote from cottonseed-oil mills. When transportation to the mills is easy, much of it goes in that direction.

The most troublesome weed in all the cotton region is crab-grass. This is characterized as "most fatal", "great trouble," "pest," "worst enemy," etc. Cocklebur ranks second and careless-weed or smart-weed third as "pests" in all parts except the Central Basin, where careless-weed is second and cocklebur third. Other more prominent weeds are foxtail grass, rag-weed, purslane, and hog-weed.

The farms or plantations in the cotton region, as a whole, vary from 5 to 2,000 acres, rarely 3,000. The largest are in the alluvial region of the Mississippi, the midland counties of West Tennessee, and the Central Basin. It is impossible to make out the average size of farms from the answers in the schedules with even an approximation to correctness, either for the whole area or any of its leading subdivisions.

Mixed farming is general throughout the entire region.

Supplies are everywhere chiefly raised at home. In West Tennessee some are imported from Saint Louis. Memphis, Cincinnati, Louisville, and Nashville, the point from which they are imported depending upon the facility of transportation. The tendency of raising supplies at home is evidently increasing.

Taking the whole cotton region into consideration, the chief laborers are negroes, and landlords often express a decided preference for them. There are no Chinese, and but few foreigners of any kind. In some parts of the region the proportion of white as compared with negro laborers is considerable. In the extreme northwestern counties the proportion is large, more than half, and in the summit region of the water-shed it is about half; but in the western valley of the Tennessee river and in the western subdivision of the highlands the whites predominate.

The wages paid will average throughout the area about \$10 per month, including board. In the extreme western part the rates appear to be higher, averaging \$12. In most cases the wages are due at the end of the year, though money and provisions may be advanced at any time. Many are hired by the month, and even by the day. Farms are often worked on shares. In such cases the landlords furnish for the most part all implements and the means necessary for the support of hands and for carrying on the farm work. In general, the system gives satisfaction, though occasionally objections are recorded against it.

The proportion of negroes owning houses or land is small, approximately 5 per cent for the whole region. In the bluff and midland counties of West Tennessee and in the Central Basin the proportion is, according to reports, from 4 to 5 per cent. In the section lying between these, where the negro population is comparatively small (the Tennessee Ridge region, the western valley of the Tennessee, and the highlands), the proportion is greater, ranging from 8 to 13 per cent. The reports vary much as to the condition of the negroes, the general inference to be drawn being that the frugal and industrious—and there are not a few of this class—are prosperous, improving, and in general doing well, but that the improvident and indolent, of whom there are too many, are poor and uncomfortable, and likely to remain so. There is a general disposition to treat them fairly and kindly, though in rare cases doubtless they are imposed upon by selfish and designing men.

A remark further is added as to the increase in the total cotton product of 1879 over that of 1869, as shown by the census reports. Taking the whole state, and allowing for manifest errors in the report of 1870, and making the proper reductions, the total product of 1869 becomes 147,824 bales of 475 pounds each, and the total for 1879 is 330,621 bales, an increase of 124 per cent. over the product of 1869. The main increase was in West Tennessee. In the Central Basin it amounted to 47 per cent. In East Tennessee it was greater than elsewhere, though here but comparatively little cotton is raised.

Table of analyses of Tennessee soils and subsoils.

Number.	Name.	Locality.	County.	Vegetation.	Depth in inches.	Insoluble residue.	Soluble silica.	Total insoluble residue and silica.	Potash.	Soda.	Lime.	Magnesia.	Brown oxide of manganese.	Ferric oxide.	Alumina.	Phosphoric acid.	Sulphuric acid.	Carbonic acid.	Volatile matter.	Total.	Hygroscopic moisture.	Temperature of absorption C.°	Analyst.
1	Red clay soil.....	Florence station .....	Rutherford .....	Species of hickory, red, white, and post oaks, elms, ash, honey-locust, black walnut, wild cherry, sugar-tree, poplar, hackberry, red-bud, dogwood, and paw-paw. Originally covered with cane.	7 to 15	79.580	3.628	83.208	0.150	0.065	3.054	0.029	0.195	3.420	4.988	0.242	0.089	.....	4.962	100.402	8.64	23.9	Durrett.
2	Red clay subsoil.....	do .....	do .....		7 to 15	66.092	11.697	77.789	0.508	0.088	0.119	0.204	0.272	6.837	10.209	0.305	0.079	.....	3.728	100.228	8.84	17.2	McCanley.
3	Red clay soil.....	do .....	do .....		7 to 15	80.850	5.266	86.116	0.140	0.034	0.510	0.024	0.175	3.768	4.173	0.207	0.102	.....	4.784	99.973	7.23	23.9	Durrett.
4	Red clay subsoil.....	do .....	do .....		7 to 15	81.670	6.080	87.750	0.211	0.033	0.161	0.301	0.157	3.613	6.220	0.056	0.008	.....	1.966	100.476	5.59	17.2	Cory.
7	Red clay soil.....	J. W. Burton's (3 miles north of Murfreesborough).	do .....	About as above.....	8 to 20	75.350	7.310	82.660	0.255	0.258	0.340	0.296	0.038	5.184	5.567	0.079	0.079	.....	4.962	99.718	7.29	22.2	Do.
8	Red clay subsoil.....	do .....	do .....		8 to 20	76.470	6.010	82.480	0.251	0.050	0.142	0.074	0.149	4.773	7.774	0.056	0.072	.....	4.230	100.051	7.99	22.2	Do.
9	Red clay soil.....	W. G. Harding's (Belle Meade).	Davidson .....	Oaks, elms, hickories, ash, linden, sugar-maple, hornbeam, walnut, cherry, dogwood, and red-bud. Originally in cane.	8 to 20	56.540	8.840	65.380	0.468	0.108	6.540	0.569	0.187	7.286	12.419	0.563	0.156	.....	6.318	99.994	10.55	26.6	Do.
10	Red clay subsoil.....	do .....	do .....		8 to 20	47.950	11.010	58.960	0.752	0.174	8.382	0.615	0.091	9.584	17.303	0.355	0.188	.....	3.591	99.995	11.01	26.6	Do.
6	Red clay subsoil.....	do .....	do .....	Poplar abundant; sweet gum also frequent; walnut, oaks, ash, elm, hackberry, honey-locust, and dogwood. Originally covered with cane.	8 to 20	54.932	10.540	65.472	0.242	0.054	3.015	0.675	0.152	9.761	16.272	0.175	0.119	.....	4.208	100.145	9.70	17.8	Do.
11	Poplar soil.....	Vanleer Polk's.....	Maury.....		11 to 23	79.270	5.472	84.742	0.319	0.059	0.515	0.342	0.040	3.683	5.204	0.349	0.132	.....	4.549	100.084	8.62	29.0	Do.
12	Poplar subsoil.....	do .....	do .....	About the same as 11 and 12.....	11 to 23	73.340	8.531	81.871	0.327	0.080	0.547	0.358	0.088	5.285	7.120	0.342	0.107	.....	3.372	99.497	11.43	29.0	Do.
13	Poplar soil.....	Hermitage.....	Davidson .....		10 to 22	78.860	6.900	85.760	0.238	0.047	0.378	0.368	0.093	2.627	6.066	0.255	0.085	.....	4.498	100.415	10.02	28.2	Do.
14	Poplar subsoil.....	do .....	do .....	Poplar, sweet gum and hickories; oaks, red-bud, and dogwood. Cane originally.	10 to 22	75.100	8.930	84.030	0.584	0.114	0.468	0.444	0.054	3.693	6.979	0.318	0.056	.....	2.483	99.223	10.00	28.2	Do.
15	Upland soil.....	Gill's station .....	Shelby.....		6 to 18	84.646	4.466	89.112	0.332	0.085	0.248	0.677	0.030	2.416	2.333	0.083	0.089	.....	4.159	99.555	5.00	16.0	Colby.
16	Upland subsoil.....	do .....	do .....	.....	6 to 18	83.128	3.853	86.981	0.399	0.181	0.243	0.438	0.042	3.664	5.026	0.064	0.010	.....	2.620	99.668	6.31	17.0	Do.
17	Loess soil.....	Memphis Bluff.....	do .....		.....	73.113	3.390	76.503	0.433	0.180	3.967	3.291	0.094	4.687	3.102	0.319	0.060	5.561	1.730	99.927	4.67	16.0	Do.

NOTE.—With the exception of Nos. 3, 4, 7, and 8, the soils and subsoils analyzed were each an average sample obtained by thoroughly mixing samples taken in the same lot from three excavations or holes dug for the purpose. Nos. 3 and 4 were obtained from a single hole, and are not averages. Nos. 7 and 8 are each an average of four samples from as many holes. In every case the lands supplying the samples have never been cultivated or entirely cleared. All are pasture grounds, with more or less of the native growth remaining.

---

PART II.

---

AGRICULTURAL DESCRIPTIONS

OF THE

COTTON-PRODUCING COUNTIES

OF

TENNESSEE.

---



# AGRICULTURAL DESCRIPTIONS

OF THE

## COTTON-PRODUCING COUNTIES OF TENNESSEE.

In the descriptions which follow, the counties are arranged in groups according to the natural divisions to which they severally, either wholly or predominantly, belong. Each county is noticed separately and as a whole. Where a county lies in two divisions, its name is given in both; but it is described under the head of the division to which it chiefly belongs, and reference is made to this. The asterisk (\*) indicates that the description of the county to which it is attached appears under some other regional head. It may be stated here that in Part I of this report many counties have been incidentally noticed or partially described. To such notices or descriptions references are made whenever it may be deemed desirable. Under each county head the statement of woodland refers to the original condition of the land before it was cleared and brought into cultivation.

Following the descriptive notices of the several counties are abstracts from such parts of the reports of correspondents as refer to natural features and production. In many instances abstracts from two or more persons who describe the same region have been combined. The substance of the remainder of the reports, referring to agricultural and commercial practice, will be found in Part III, at the beginning of which is also a complete list of correspondents, with their post-offices, and the names or location of the particular regions which they severally discuss.

---

### ALLUVIAL PLAIN OF THE MISSISSIPPI RIVER.

This region embraces the whole of Lake, large parts of Dyer\* and Lauderdale,\* and small parts of Tipton\* and Shelby\* counties.

#### LAKE.

*Population:* 3,968.—White, 3,274; colored, 694.

*Area:* 210 square miles.—Woodland, all.

*Tilled lands:* 34,666 acres.—Area planted in cotton, 3,249 acres; in corn, 14,730 acres; in wheat, 1,608 acres; in oats, 108 acres; in tobacco, 5 acres.

*Cotton production:* 2,412 bales; average cotton product per acre, 0.74 bale, 1,059 pounds seed-cotton, or 353 pounds cotton lint.

Lake is the only county in Tennessee wholly within the alluvial plain of the Mississippi river. It lies compressed between the Mississippi on the west and Reelfoot lake on the east. Its area is long and narrow, having a length of 23 or 24 miles and a width varying from 3 to 11 miles. There are no uplands proper, but as a general thing the lands are higher along the Mississippi, becoming lower as we approach the lake. About one-third of the county is entirely above overflow from the river. Of the remainder, one-third seldom overflows, and only in very high water, and this is said to be the most productive part. The northern third of the county, the wider and better part, is mostly above overflow and nearly all under cultivation. Two-thirds of the middle part is also under cultivation, there being good sections of land both on the Mississippi and the Reelfoot sides. Alternating belts of timber and cultivated lands extend longitudinally through the southern part, and a cultivated strip is usually found near the river and parallel with it. Much of the southern end, comparatively, is subject to overflow. The same may be said of a strip along Reelfoot lake in the northeastern corner of the county. (See also description of the region.)

The soils are described as black and yellow, alluvial, and sandy and mixed loams. Alternating with these are buckshot clays. The general growth is cottonwood, sweet gum, ash, oak, hickory, pecan, elm, hackberry, walnut, box-elder, red maple, mulberry, and cypress, with papaw and spicewood undergrowth. Shipments are made to Memphis, New Orleans, or Saint Louis, by steamboat, at from \$1 to \$1 50 per bale.



## ABSTRACTS FROM REPORTS.

C. M. PEACOCK AND DAVID WAGONER.—The soils of the county are the (1) black alluvial; (2) the black sandy loam; (3) the buckshot and light sandy. The first is the chief soil, forming one-fifth of the land, and occurs at intervals over the county. It is from 1 foot to 10 feet in thickness, very porous, readily drains itself, and is easily cultivated. The crops produced are cotton, corn, wheat, oats, Irish and sweet potatoes, and peanuts, to all of which the soil is well adapted. One-fifth of the tilled land is planted in cotton. Plants grow to a height of from 4 to 8 feet, that not exceeding 5 feet being the best. Wet seasons and too much plowing cause the plant to run to weed. The remedy is less and shallow plowing. The product of seed-cotton per acre on fresh land is from 1,200 to 1,500 pounds, 1,780 pounds being required for a 475-pound bale. Staple, good ordinary. After twelve years' cultivation the yield is from 2,000 to 2,500 pounds, requiring 1,660 pounds for a bale, and the staple is much better than that from fresh land. The troublesome weeds are cocklebur, smart- and careless-weeds, and crab-grass. No land of this kind lies turned out.

The *black sandy loam* aggregates one-third of our lands, and occurs scattered over the county, and at a depth of 3 feet is black dirt or white sand. One-fifth of the cultivated land is in cotton, which grows to a height of from 5 to 10 feet, the lower the better. In wet weather the plants are kept down by plowing but little and by cultivating with the hoe. Seed-cotton product on fresh land is from 500 to 800 pounds per acre, requiring 1,900 pounds for a 475-pound bale, rating as good ordinary. After twelve years' cultivation the yield is from 1,800 to 2,000 pounds, of which 1,660 pounds are required for a bale, the staple being much better than that from fresh land. Weeds same as above.

The *buckshot soil* constitutes one-fifth of the lands, and exists in small spots over the county; thickness, 5 feet. This soil is not easily tilled in wet seasons, and is hard to manage in dry. It is best adapted to corn, and very little cotton is planted. Cotton attains a height of from 2 to 4 feet, the latter being the most productive. The seed-cotton product on fresh land is from 800 to 1,000 pounds, and after ten years' cultivation 1,500 pounds. The weeds are foxtail and cocklebur.

R. S. BRADFORD.—The uplands are very level and rich, and almost all are fit for cultivation. The chief cotton soil is a black, moderately stiff soil, which comprises from one-half to two-thirds of white sand, the remainder being clay. Pebbles are met with at a depth of 35 feet. The chief crops are corn and cotton, about one-twentieth being planted in the latter, but it is well adapted to either. The yellow sandy soil is about one-fifteenth of our lands, and occurs throughout the county. One-twentieth is planted in cotton, to which it is well adapted, as also to corn. The buckshot clay forms about one-fourth of the lands, and occurs throughout the county. It is best adapted to cotton, in which one-twentieth is planted. All these soils have the same growth of timber.

R. M. DARNALL (northwestern part of the county).—This region is continuous with Madrid Bend, in Kentucky. The higher lands are alluvial, and are elevated above overflow. They are so surrounded by the river that cotton is often protected from frost when in other localities, even farther south, it is killed. The kinds of soils are: (1) White sandy; (2) yellow sandy; (3) putty or buckshot clay. The chief is the white [gray] sandy soil. One-twentieth of our land is of this kind, and occurs from Cairo, Illinois, to Memphis. Three-fourths of the subsoil of Lake county is underlaid, in some places at 15 feet, by gravel. The soil is easily cultivated in wet or dry seasons, and two-thirds of it is planted in cotton, the other chief crops being corn and wheat, but it is well adapted to any crop. Cotton grows from 3 to 7 feet high, but is best at 5 feet. On fresh land, unless the season is dry, the plant goes to weed. It produces about 1,200 pounds of seed-cotton, requiring 1,900 pounds for a 475-pound bale. Land twenty years old produces a bale of lint to the acre. The lands are level, and there is no washing.

L. DONALDSON (Mississippi bottom, near the margin of Reelfoot lake).—The black clay (buckshot) with a substratum of sand forms one-half of our lands, and extends 2 and 3 miles in each direction. The subsoil is either a brown sand or black putty clay, not impervious. Tillage is generally easy, but difficult after wet springs followed by dry seasons. Crops are various. The land is best adapted to corn and cotton, and one-fourth of it is planted with the latter. The seed-cotton product on fresh land is 1,900 pounds per acre, 1,660 being required for a 475-pound bale. It rates as low middling and good ordinary. After ten years the product per acre is 1,600 pounds. On the mixed sand the product, after the same time, is 1,500, and on the sandy land 1,200 pounds per acre, the staple being the same as before. One-half per cent. only is turned out. Such land taken in again is better by 25 per cent.

J. W. FOWLER (between Reelfoot lake and the river).—The report agrees substantially with that of L. Donaldson.

## DYER.

(See "The Bluff region".)

## LAUDERDALE.

(See "The Bluff region".)

## TIPTON.

(See "The Bluff region".)

## SHELBY.

(See "The Bluff region".)

MISSISSIPPI ALLUVIUM (in part) AND BLUFF REGION.

This region includes nearly all of Obion county, and the larger parts of Dyer, Lauderdale, Tipton, and Shelby.

OBION.

*Population:* 22,912.—White, 18,841; colored, 4,071.

*Area:* 540 square miles.—Woodland, nearly all, excepting the area of Reelfoot lake.

*Tilled lands:* 109,857 acres.—Area planted in cotton, 7,259 acres; in corn, 45,005 acres; in wheat, 25,368 acres; in oats, 2,105 acres; in tobacco, 1,432 acres.

*Cotton production:* 4,225 bales; average cotton product per acre, 0.58 bale, 828 pounds seed-cotton, or 276 pounds cotton lint.

Previous to 1870 Obion was the most northwesterly county of the state. In the year mentioned a large part, all west of Reelfoot lake, was cut off to make Lake county, the old county thereby losing well-nigh all of its share of the Mississippi bottom, and its best lands. The lake was retained.

The county is in the main one of our most fertile areas. Uplands predominate, and their soils are based chiefly upon the formation we have called the loess. The description given of this formation and of the soils of the Bluff region on page 17 of this report applies to this county, and the reader is referred to what is there said. I note here that the loess is underlaid by gravel and sand, and these again by clayey beds. Hence it happens that the subsoils of the uplands are often underlaid, at greater or less depths, by gravel or sand, or both, and further, that the lower lands often have a clay basis. The very fine ashen or yellowish loess is frequently considered popularly as clayey matter, and is so called.

The uplands are often rolling, but supply extensive level tracts. Approaching the bluffs in the western part of the county they become more or less hilly. A narrow alluvial tract lies along the eastern border of Reelfoot lake, between the lake and the foot of the bluffs. This land is rich and fertile, and some of it is subject to overflow. That above overflow yields good crops of cotton, and upon all of it farmers manage to raise heavy crops of corn. The timber is cypress, ash, walnut, and cottonwood, with an undergrowth of cane. Alluvial lands or bottoms, subject to overflow, occur on both sides along the Obion river and its forks, which traverse the southern part of the county. The bottoms often extend out a mile or two from the river. The soils are a thin, crawfishy clay, and support chiefly a growth of beech and cypress, with an undergrowth of cane. Outside of these are the second bottoms, above overflow, often supplying a level country with a rich and productive soil. The second bottoms rise gradually into uplands, together giving a belt of country of great fertility, and once remarkable for its heavy timber, great "poplars" and oaks, gum, beech, sugar-tree, and hickory, with cane and papaw beneath.

ABSTRACTS FROM REPORTS.

J. H. McDOWELL (continuation of abstract in Part I, region of Hoosier creek).—The lowlands are very level for 10 miles east and west by 8 miles north and south, and the soil is better adapted to cotton culture than is usual with sections so far north. While the seasons are short for cotton, the yield will compare well with points much farther south. The nature of the soil is such, especially on the uplands, as to force and hasten maturity. Yet this cannot properly be considered a cotton-producing region. Cotton in the bottoms runs too much to weed, and is often cut short by frost.

The chief soil, the light blackish upland, rests upon a heavy gray to light brownish-gray subsoil, which in turn is underlaid by sand and gravel at from 10 to 20 feet. The land is easily tilled, especially after the first breaking and harrowing. It is looser in dry seasons, and, if well drained, is early and warm. The chief crops are cotton and corn on the uplands, and corn, wheat, and tobacco in the lowlands, corn best suiting the soil. Cotton is planted in the proportion of one-sixth for the uplands and one-twentieth for the lowlands. The height attained is 4 feet, the most productive. It runs to weed in low wet lands. The seed-cotton product on fresh land is from 600 to 800 pounds, of which 1,660 pounds are needed for a 475-pound bale. After five years' cultivation the land (unmanured) yields from 800 to 1,200 pounds, requiring 1,545 pounds for a bale. The staple from the old land brings from one-fourth to one-half cent more, but there is no positive rule as to this. Some fresh lands yield a staple equal to that from old lands, while others in the same locality supply an inferior article. As to the yield per acre, I may state that it was last season (1879) far above the figures given in this report, the second-class lands running as high as 1,500 pounds, and the first, in favorable locations, occasionally as high as 1,800 pounds. The weeds are crab-grass and cocklebur in bottoms, crab-grass and smart-weed on uplands. About one-hundredth part of the uplands are "turned out"; none of the lowlands. Rest helps comparatively level land. The slopes are injured by washing, but the valleys are improved by the material thus brought upon them. A good deal of ditching has been done, the lands thereby becoming drier and warmer.

The *black loamy lowland* forms four-fifths of the lands in this region, and occurs over an area 8 by 10 miles in extent. Its growth is hickory, ash, gum, sassafras, walnut, red, white, black, and turkey oaks, hornbeam, box-elder, beech, and maple. It rests upon a gray clayey subsoil containing brownish gravel, underlaid by sand at from 10 to 20 feet, and readily drained. The land is easily tilled in wet or dry seasons, is late and cold, and is best adapted to corn, wheat, and tobacco. Only about one-fortieth part is planted in cotton.

B. W. HERRING (western part of the county).—The upland, the best for cotton and most used, is a light clay, mixed with some sand, ashen-colored or gray, making three-fourths of the lands. Its timber is oak, hickory, poplar, ash, and walnut. The soil, 12 inches thick, is underlaid by a light yellowish subsoil. The land is easy to till in dry weather, but difficult in wet. Its chief crops are corn, wheat, tobacco, and grasses. Not more than one-tenth part is planted in cotton. The weeds are rag-weed, cocklebur, white-top, and crab-grass.

J. S. MURPHY (northeastern part of the county).—The land in this section is termed ridge land, and is situated between Harris' fork and Obion river. We have substantially but one soil, known as gray soil. The entire section, excepting a small amount of glade, is of this kind. It extends 8 miles to the south and west and 15 or 20 miles to the north and east. Its growth is oak, hickory, dogwood, walnut, poplar, gum, elm, red-bud, and hazel. It is from 4 to 6 inches thick, and rests upon yellow clay. The land is productive, any kind of crop growing well. One-fifth of the land is planted in cotton, which grows from 2½ to 3 feet high, the latter giving the best yield. The seed-cotton product per acre is from 1,200 to 1,800 pounds, 1,600 pounds being required for a 475-pound bale. The staple rates as middling. I have gathered 1,600 pounds per acre from land after six years' cultivation. The staple from the older land is shorter and not so good. The weeds are hog-weed and crab-grass. I do not know that an acre of this land is "turned out".

## DYER.

*Population:* 15,118.—White, 11,206; colored, 3,912.

*Area:* 570 square miles.—Woodland, all, excepting a few small lakes in the bottoms.

*Tilled lands:* 76,194 acres.—Area planted in cotton, 14,637 acres; in corn, 27,820 acres; in wheat, 11,820 acres; in oats, 1,961 acres; in tobacco, 364 acres.

*Cotton production:* 8,564 bales; average cotton product per acre, 0.59 bale, 834 pounds seed-cotton, or 278 pounds cotton lint.

Dyer county is not far from being equally divided between bottom lands and uplands. The western part lies in the alluvial plain of the Mississippi, while the eastern is high land pertaining to the bluff region. The reader is referred to what is said under these heads on page 15 for general characteristics. The Mississippi bottom is traversed by the Obion river, and as a whole is thinly settled. The interrupted strip of cultivated land along the Mississippi river has been referred to in Part I. Within the bottom the Forked Deer river, which runs westward into the Mississippi, is the boundary between Dyer and Lauderdale counties. Leaving the bottom of the Mississippi and entering the bottom lands proper of the Forked Deer, in Dyer county, the latter are found to have a sandy loam of great fertility, giving some of the best cotton-producing areas in the county. Other good alluvial lands are found along the tributaries of Forked Deer and Obion rivers. Bottoms, however, occur which are clayey, cold, and subject to overflow.

The highlands have a general elevation of from 100 to 150 feet above the Mississippi bottoms. They are frequently level, often undulating, but become broken when approaching the bluffs, where they end abruptly in a steep escarpment overlooking the great alluvial area to the west. The soil is a rich brown loam, based on loess, having had a native growth, as in Obion, of very heavy timber, poplar, gum, white oak, sugar-tree, ash, walnut, elm, and dogwood, with species of a smaller growth. These lands present an agricultural region of great interest, and among the best in the state.

Cotton is shipped to Memphis, New Orleans, or Cincinnati at \$2 50 to \$3, and by rail or by water to Memphis at \$1 per bale.

## ABSTRACTS FROM REPORTS.

(An abstract from L. M. Williams' report has already been given.)

C. H. PATE.—The alluvial and cultivated belt along the Mississippi river is interrupted at intervals, but extends for 75 miles up and down the river. It is a sandy soil from 18 to 20 inches thick, with a growth of cottonwood and sycamore. The subsoil with very few exceptions is sandy. The crops are cotton and corn, the soil suiting both. One-half the lands are put in cotton. The plants grow to 5 feet in height, and at that are most productive. Bolling is favored by topping or removing the bud in July. The seed-cotton product is 1,800 pounds per acre, requiring 1,600 pounds for a 475-pound bale. The product is about the same on old land, requiring 1,545 pounds for a bale. In the latter case the staple is one grade better. A vine known as the devil's shoe-string is a troublesome weed. No land is turned out.

A. HARRIS (east and northeast of Dyersburg).—We have two kinds of soils or lands: (1) dark loamy uplands, mostly cultivated in cotton, and presenting great uniformity; (2) light sandy soil of the bottoms, not so great in area, but better for cotton. The first and chief soil makes three-fourths of our lands, and occurs out of bottoms all over the county. It is from 6 to 12 inches in thickness, and rests upon a subsoil of reddish clay, which crumbles in water, and is liable to wash on slopes. The subsoil contains small pebbles in places, and is underlaid by sand. The soil is easily tilled, and is early, warm, and usually well drained. The crops are corn, cotton, tobacco, wheat, oats, clover, timothy, and red-top, all of which grow well. About one-fourth is planted in cotton. Cotton reaches a height of 4 feet, and is then most productive. It runs to weed in warm, wet weather, and through continuous cultivation. Plowing close to the cotton and throwing the dirt from the roots check the growth. The seed-cotton product is from 1,200 to 1,500 pounds, requiring 1,780 pounds for a 475-pound bale. The staple rates as low middling to middling. After ten years the product is from 800 to 1,200 pounds, requiring 1,900 pounds for a bale, the staple being shorter but finer. Weeds are cocklebur and careless-weed. Very little land lies "turned out". Such land, when manured and clovered, produces as well as ever. The soils wash on slopes unless prevented by circling. Some ditching has been done with good results.

The sandy soils of the bottoms make about one-tenth of the lands in cultivation. The growth is oak, hackberry, box-elder, gum, ash, and maple. The soil is best adapted to corn and cotton, one-third being planted in the latter. The cotton grows to a height of 4 or 5 feet, and at this is most productive. The seed-cotton product is from 1,500 to 2,000 pounds per acre, 1,780 pounds being needed for a bale. The change in the land and in the cotton produced is very small after a number of years.

D. C. CHURCHMAN AND SMITH PARKS (northeastern part of the county, covering about 10 miles square between the Obion and Forked Deer rivers, and waters of Reed's and other creeks).—But little of the bottom land is in cultivation. The uplands are undulating, from 6 to 12 inches deep, resting on a red clay subsoil, and are much alike in productiveness. The growth is poplar, ash, oak, and elm. Twice within my recollection has the cotton all been killed by frost on the 18th of September. The yield per acre depends much as to whether killing frosts come early or late in October. Our soils are a clay loam with some sand in them, and present no noteworthy differences. They are dark in color, and sometimes yellowish, and are underlaid by sand at various depths. The crops produced are corn, wheat, cotton, tobacco, and clover, with various grasses for hay. About a fourth of the land is put in cotton. It grows from 2 to 6 feet in height; 3 feet is a good height. Too much rain in July and August causes it to run to weed. To remedy this and to favor bolling some practice topping; others plow, throwing the dirt from the cotton. The seed-cotton produced on fresh land varies from 800 to 1,600 pounds per acre, of which about 1,780 pounds will pay toll and make a bale. The staple rates as low middling and middling. After five years' cultivation the land produces as well as at first if well circled. The troublesome weeds are cockleburs and crab-grass. Very little of the land lies turned out.

## LAUDERDALE.

*Population:* 14,918.—White, 9,081; colored, 5,837.

*Area:* 410 square miles.—Woodland, all, excepting a few small lakes in the Mississippi bottom.

*Tilled lands:* 58,010 acres.—Area planted in cotton, 24,083 acres; in corn, 22,580 acres; in wheat, 3,889 acres; in oats, 1,375 acres; in tobacco, 58 acres.

*Cotton production:* 13,250 bales; average cotton product per acre, 0.55 bale, 783 pounds seed-cotton, or 261 pounds cotton lint.

Lauderdale county is approximately a square area, and lies between the Forked Deer river on the north and the Hatchie river on the south. Like Dyer, it is nearly equally divided between bottom lands and uplands. On the west

we have the alluvial plain of the Mississippi; on the east, the high plateau lands of the bluff region. The line of bluffs, the abrupt western limit of the high or plateau lands, runs in a nearly northeasterly and southwesterly direction through the middle of the county, dividing it as stated. The Mississippi alluvial portion has been sufficiently described by Mr. J. L. Lea, of Fulton, and Mr. J. C. Marley, of Ripley, on page 15 of this report, under the head of the Mississippi bottom region. The growth of the bottoms is cypress, gums, oak, sassafras, hickories, pecan, mulberry, hackberry, coffee-nut, walnut, cottonwood, willow, sycamore, and cane. Low bottoms or first bottoms, often cold and swampy, are found very generally along Forked Deer and Hatchie rivers.

The upland portion has the general features of the bluff region (page 17), and is of course much like the plateau portions of Obion and Dyer counties. It is limited on the north and south, respectively, by the bottom lands of Forked Deer and Hatchie rivers, and is traversed by a number of creeks, the most important of which are Cane, Coal, and Knob creeks. Between the streams are extensive tracts, both level and rolling, occasionally becoming hilly. Fertile second bottoms succeed these as we approach the first bottoms. The uplands were originally very productive and were preferred for cotton on account of its maturing earlier, and in many sections, where not too much worn, are still preferred. The second bottoms and the sandy first bottoms are usually rich and yield well, better than the uplands, but their crops are more in danger from early frosts. The native growth of the uplands is poplar, oaks, hickories, ash, beech, sassafras, some chestnut, and sweet and black gum.

Cotton is shipped by water to Memphis at 75 cents, to New Orleans at \$1 25, and to Saint Louis at \$1 per bale.

#### ABSTRACTS FROM REPORTS.

(Items from the report of F. T. Rice, of Durhamville, have been given under the head of "the Bluff region", in Part I.)

J. F. YOUNG (county generally).—Cotton on sandy lowlands matures as early as on the uplands, and since the uplands, though very productive when fresh, deteriorate greatly, the lowlands, even without sand, are more desirable for cotton and much more so for corn. We have two qualities of uplands, poplar predominating on the one and oak on the other. Both are productive when fresh. The poplar lands are considered the best. The kinds of soil under cultivation are: (1) Light mulatto soil on uplands or slopes; (2) dark loams of the second bottoms of the rivers and creeks; (3) sandy bottom soils of the Mississippi. The chief soil is the mulatto upland. About one-half of Lauderdale county is of this kind. It covers an area 20 miles long by 10 wide, varying in thickness from 6 to 12 inches. Its subsoil is tough yellow clay, baking hard when wet and exposed to the sun. By cultivation it gradually becomes like the soil, but is not so friable. It is nearly impervious when undisturbed; is underlaid by sand and gravel at from 10 to 20 feet, and is generally easily cultivated, except when wet. The chief crops are corn, cotton, wheat, and oats. Nearly one-half the land is planted in cotton, growing on comparatively fresh land to 4 and 5 feet, and at this height is most productive. Cotton runs to weed on rich and wet lands in wet seasons. Very shallow tillage may restrain the plant and favor bolting a little, but very little. The seed-cotton product per acre on fresh land is 1,000 pounds, requiring 1,660 pounds for a 475-pound bale. The staple is very good. After ten years' cultivation the product is from 700 to 1,200 pounds if the land is kept from washing by horizontalizing. In this case 1,660 pounds are also required for a bale, and the staple is about the same as the other, excepting on very poor land, when it is shorter. The weeds are crab-grass and cocklebur. Very little of the land lies turned out. Hilly or broken lands, when turned out, wash so badly that their restoration costs more than they are worth. The slopes wash readily, causing serious damage. The valleys are not injured much thereby, there being little sand in the washings. Considerable horizontalizing and hillside ditching have been tried, with satisfactory results when well done.

The dark loams of the second bottoms of Forked Deer and Hatchie rivers form a fifth of the lands, occurring in areas from a fourth to 1 mile or 2 miles in width, and from 5 to 10 miles in length. The natural timber is poplar, ash, red and white oaks, beech, hickory, hackberry, sweet gum, and dogwood. The soil is from 8 to 12, or in places 4 to 5 inches thick, and has for the most part a subsoil resembling that of the uplands, which is underlaid by sand and gravel at from 10 to 15 feet. It is later and colder than the uplands, especially where not well drained. The soil is best adapted to corn and cotton, and when thoroughly drained produces wheat well. One-half of it is put in cotton, which grows to a height of 5 or 6 feet. The seed-cotton product on fresh land is from 1,200 to 1,800 pounds, according to season, requiring 1,660 pounds for a 475-pound bale. The staple is equal to any. After ten years' cultivation the product is nearly as good as at first, and the staple about the same. The weeds on this soil are crab-grass, smart-weed, and cocklebur. None of it, to my knowledge, lies turned out. This land is generally nearly level, and does not wash badly. Some of it is rolling enough to be benefited by horizontalizing, but does not need hillside ditching. Parts of it would be benefited by underdraining, but very little of this is done.

The following special descriptions are given by other correspondents, in addition to the soils described above:

P. T. GLASS AND JOE L. LEA.—Cotton on the margins of rivers and lakes is protected from frost in the spring and fall by the waters. The first bottom soils of the Hatchie are clayey and cold; the second make a rank growth of cotton. The lands of this and the Mississippi river embrace clay and sandy loams and stiff buckshot clays.

E. R. OLDHAM AND I. A. LACKEY (eastern part of the county).—The uplands of Cane creek and its tributaries are undulating and rather hilly, but the soils are very productive. The bottom soil forms about one-fifth of the lands, and lies along the creek in strips half a mile wide. About half is planted in cotton, which grows to a height of from 4 to 5 feet, producing most when highest. The seed-cotton product on fresh land is about 1,400 pounds, and about the same after four years' cultivation.

F. T. RICE AND J. J. ALSTON.—The chief soil of the southeastern and southern parts of the county is the dark or mulatto upland, which is best adapted to cotton, yielding about 1,400 pounds of seed-cotton per acre on fresh land, or 500 pounds after ten years' cultivation. The troublesome weeds are crab-grass, purslane, Jamestown weed, cocklebur, and hog-weed. The dark loam soil of Lagoon and Williams' creeks, or second bottom, makes one-fourth of our lands. It reaches out 25 or 30 miles. The timber growth is tupelo-gum and cane. The subsoil is red clay, baking hard when exposed, and is underlaid by some sand-rock at from 20 to 35 feet. The tilling qualities of the land are tolerably good in dry seasons, but not good in wet. It is early and warm if well drained, and is best adapted to cotton, three-fifths of the land being planted in this staple. The height usually attained is 5 feet, the best at 6 feet. The seed-cotton product on fresh land is 1,600 pounds, 1,545 pounds making a 475-pound bale. It rates as middling. After ten years' culture the product is 700 pounds, the staple being slightly better. The weeds are cocklebur, purslane, and hog-weed. None of this land lies turned out.

The Hatchie bottom soil forms one-twentieth of our lands. It is a strip 2 miles wide and very long. The soil is 3 feet thick, with a red subsoil, under which is sand at from 15 to 20 feet. It is early and warm if well drained, and is best adapted to cotton, two-thirds of the land being planted in this staple. Cotton grows to a height of 5 feet, but is best at 6½ feet. The product on fresh land and the staple are as in the second kind. After ten years' cultivation it yields 1,000 pounds per acre.

(J. H. Flowers, W. W. Hurt, R. L. Halliburton, and J. C. Marley.—Their reports of the uplands and bottom lands are similar to those given.)

## TIPTON.

*Population:* 21,033.—White, 10,482; colored, 10,551.

*Area:* 330 square miles.—Woodland, all.

*Tilled lands:* 100,666 acres.—Area planted in cotton, 38,429 acres; in corn, 32,379 acres; in wheat, 7,363 acres; in oats, 2,431 acres; in tobacco, 46 acres.

*Cotton production:* 21,415 bales; average cotton product per acre, 0.56 bale, 795 pounds seed-cotton, or 265 pounds cotton lint.

The greater part of Tipton county is upland, and is included in the bluff region belt. The line of bluffs forming the western termination of the uplands or plateau highlands strikes the Mississippi river below the mouth of the Hatchie, and, after bordering the river for several miles, and forming what is known as the second Chickasaw bluff, bears off toward Memphis, leaving a comparatively narrow strip of bottom, which has been estimated to average 4 miles in width. This, together with four islands, Nos. 35, 36, 37, and the one named Centennial, makes up the part of the Mississippi alluvial plain pertaining to Tipton. The parts of the islands in cultivation, presenting superior cotton lands, aggregate something more than one-seventh of their area (see page 14). The limited cultivated lands along the east bank of the Mississippi occur chiefly in two separate strips. Much of the alluvial plain within the county, as well as of the first bottoms of the Hatchie river, is subject to overflow.

The surface of the upland portion of Tipton county might be inferred by one knowing the characteristics of the bluff region belt. It is in general an undulating table-land, traversed here and there by creek valleys. In some parts it becomes hilly, especially as we go westward and meet the breaks of the bluffs. The fresh soils are generally dark brown, rich and productive, resting upon a yellowish or reddish, siliceous, and often compact subsoil. Dark alluvial soils lie at intervals along the creeks and branches. The second bottoms and gently sloping lands between the streams and the highlands present very fertile and important agricultural areas. Nearly all the lands in Tipton, except those of the low bottoms subject to deep overflow and some steep hills, are suitable for cotton culture. As compared with the total area, the southeastern part of the county lies in the belt of highest percentage of acreage in cotton.

Cotton is shipped to Memphis by rail at \$1.75, and by water to Saint Louis or New Orleans at \$1 per bale.

## ABSTRACTS FROM REPORTS.

DR. W. H. HILL, S. P. DRIVER, AND J. U. GREEN.—The upland soil of Town creek and Big Hatchie river is a black loam. Some of the flats near the creeks and large branches have patches of a white gravelly soil; the balance is a rich loam. Cotton in the valleys and lowlands is liable to injury by frost. The land is too rich and the cotton runs too much to weed. Our remedy is to plant early, and generally to top the cotton, checking the growth. The uplands are preferred for cotton, as they are more easily cultivated, are better drained, which is a great item, and the crop matures earlier. The kinds of soils are: (1) Clay loam uplands; (2) black loam of Town creek and Hatchie river above overflow; (3) whitish gray or crawfishy. The chief soil is the clay loam, forming three-fifths of our lands, and extending in every direction to the confines of the county. Its growth is white and black oaks, poplar, hickory, black and white walnuts, sugar-maple, and other varieties. In the main, the subsoil is a rich, red clay, which under the microscope shows fine particles of sand, and is easily gullied. It is underlaid by sand and gravel at from 10 to 20 feet. The chief crops are corn, cotton, wheat, oats, potatoes, and sorghum, the soil being well adapted to these. Over one-half is planted in cotton, which grows to a height of from 3 to 5 feet, and is most productive at 4 feet. To restrain the plant and favor bolling we plant early, run no center furrow when bedding, bar off while cultivating, and top. On fresh land the seed-cotton product per acre is from 1,000 to 1,500 pounds, 1,780 pounds being required for a 475-pound bale. The staple is from low middling to middling. After fifteen years' cultivation the product is on fair upland, which has been rotated, 800 pounds. The texture is as good, though probably not so long in fiber. The weeds troubling us are careless-weed, purslane, and crab-grass. In the southeastern portion of the county one-eighth of this land lies turned out; in other parts, none. By putting in clover or peas such land in a few years can be made to yield good crops. The soil washes readily on slopes, and the valleys are injured at least 33 per cent. Hillside ditching to a small extent and horizontalizing have been tried with the best results. It is to be regretted that it was not commenced sooner.

The *black loam* forms nearly two-fifths of our land, and generally exists in large bodies. It occurs in every part of the county, and embraces nearly all of the branch, creek, and river bottoms. Its timber is black oak, the finest in the world, red gum, ash, hickory, hackberry, walnut, mulberry, dogwood, papaw, hornbeam, and hazel-nut. Its thickness is from 1 foot to 15 feet. The subsoil is generally a red or yellow clay, which is underlaid by sand at from 20 to 30 feet. The land is easily tilled, unless suffered to bake in dry seasons before being plowed. It is best adapted to corn, cotton, wheat, and oats, and will make from 2 to 4 tons of timothy or clover per acre. All well-drained portions are planted in cotton. It grows from 6 to 10 feet high, but is best at 5 feet. In seasonable years it will yield from 1,200 to 1,500 pounds of seed-cotton, which rates as low middling. After fifteen years' cultivation its product is from 1,000 to 1,300 pounds, the staple not being quite so good. The weeds are cocklebur, careless-weed, and sometimes crab-grass. None of it is turned out. It does not wear out, though it may become exhausted by continuing in one crop. This land is level, and does not wash.

The *whitish-gray or crawfishy* soil forms less than one-fifth of the lands, and can be found in every part of the county at the foot of hills, in depressions on uplands, and in creek and branch bottoms. Cotton is seldom planted on such land.

J. H. SHINAULT (see abstract, Bluff region, Part I) AND DR. T. W. ROANE (southern part of the county).—On the lands of Beaver Dam creek cotton is seldom injured by frost. We prefer upland that is fresh or has been well taken care of.

*Upland gray loam* forms seven-eighths of our land, and, excepting valley lands, prevails throughout the county. Its thickness is 5 inches or more. The subsoil varies from a pale yellow, crumbling clay to a deep yellow or orange tenacious clay, and is underlaid by sand and gravel (rarely by calcareous layers) at from 20 to 50 feet. The timber growth is hickory, post, white, and red oaks, poplar, and dogwood. When new and fresh the soil is best adapted to corn and oats; when several years old and well preserved, to cotton. Sixty per cent. is put in cotton. Weeds are restrained and bolling favored by very early planting, rapid culture, early laying by, and also by the application of well-rotted manure. The seed-cotton product on fresh land is from 600 to 1,000 pounds, 1,600 pounds being required for a 475-pound bale. After ten years' cultivation the product is from 400 to 1,200 pounds, according to preservation, exposure, and previous tillage. The staple from this is finer, longer, and of a richer color than that from fresh land. Crab-grass is the worst enemy the cotton-plant has. In some localities 5 per cent. of this land lies turned out; in others, from 30 to 50 per cent. If not washed badly, it will, when cultivated again, produce well. For twenty-five years horizontalizing has been done, and where well done the washing is but slight.

The *black alluvial* of the bottoms forms 20 per cent. of our lands, there being, however, not more than 8 per cent. of this land in cultivation. One-half the cleared portion is put in cotton. The seed-cotton product on fresh land is 1,000 pounds per acre, but the yield increases as the land gets older.

The crops of the black upland soil are cotton, corn, wheat, oats, and clover. About three-fifths of this soil is planted in cotton, which grows to a height of 4 feet. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,660 pounds being required to make a bale of 475 pounds. After fifteen years' cultivation the soil will produce 800 pounds if well cared for. The troublesome weeds are crab-grass, smart-weed, rag-weed, and cocklebur. One-tenth of this land lies turned out, but most of it can be reclaimed.

The *gray buckshot soil* is that of branch bottoms, and makes about one-eighth of our soil. It is good for herd's-grass, but not for cotton. The heavy buckshot or bottom land is suited for cotton, and also produces fine herd's-grass.

A. W. SMITH (northwestern part of the county, Indian Creek lands).—The seasons often prove too short for full maturity of the crops. One-half of our cultivated land is put in cotton. The soils are gray uplands and bottom lands above overflow. The latter is a rich loam, mixed with some sand, very productive, and will make under good tillage 1,500 pounds of seed-cotton per acre. It is designated as alluvial, and aggregates a fourth of the land, and occurs near the streams all over the county. Its growth is walnut, hickory, sassafras of large size, beech, gums, cottonwood, black and white oaks, pecan, dogwood, and papaw. There is also a cold gray soil good only for grass; but there is very little of it, and it is not cultivated.

## SHELBY.

*Population*: 78,430.—White, 34,508; colored, 43,922.

*Area*: 690 square miles.—Woodland, all, excepting small lake areas in the Mississippi bottom.

*Tilled lands*: 195,726 acres.—Area planted in cotton, 92,620 acres; in corn, 55,260 acres; in oats, 5,216 acres; in wheat, 3,564 acres; in rye, 378 acres; in tobacco, 41 acres.

*Cotton production*: 46,388 bales; average cotton product per acre, 0.50 bale, 714 pounds seed-cotton, or 238 pounds cotton lint.

Shelby is the most southern of the tier of counties bordering the Mississippi river; a tier which, if Lake and Obion be made one, as they were of old, includes both the whole of the Tennessee portion of the Mississippi bottom and very nearly all of the bluff region belt. Shelby county has comparatively little of the Mississippi alluvium. The line of bluffs strikes the river at Memphis, and is not at any point many miles from it. The comparatively narrow intervening bottoms usually have their higher "front-lands" along the river, supplying cultivated strips at intervals, and lower "back-lands", often swampy, toward the bluffs. Cotton is a chief crop in the cultivated areas.

Disregarding the limited Mississippi alluvium, the county is an undulating upland plateau lying in the bluff region belt. It is abundantly supplied with streams, and the Loosahatchee and Wolf rivers traverse it. Among its creeks Big creek and Nonconnah run through large sections. The chief soil is that of the upland. This, where fresh, is a light-brown loam resting upon an ashen-gray, often yellowish or reddish-yellow, siliceous subsoil, containing more or less of both clayey and calcareous matter. The subsoil in the reports is called clay, a name not expressing its nature. It comes chiefly from the underlying formation of fine siliceous silt or earth called loess, or often, on the slopes, from a mixture of loess with material (sand, gravel, and clay) from strata underlying the loess in turn. (See further under "Bluff region", on page 17, an analysis of the soil and one of the subsoils being there given.) The lands are very fertile and vary little in character. The forest growth is heavy and varied, and consists of white and red oaks, hickories, poplar, sweet and black gums, elm, maple, cottonwood, ash, walnut, beech, honey-locust, mulberry, red-bud, dogwood, occasionally holly, and others. When first cleared the lands produced large crops for half a lifetime, but by bad culture have been in some regions much worn; yet when properly treated they may be restored to almost their original fertility. Cotton is the great staple. The county stands at the head of the list in number of bales produced, and also ranks high in the percentage of bales to the acre. About one-half of the tilled lands of the county is planted in cotton. In some parts the proportion is two-thirds or three-fourths. The bottoms of the Wolf and the Loosahatchee rivers and of the larger creeks supply in the aggregate much rich and available land. As compared, however, with the uplands it has small importance.

Shipments are made to Memphis at 65 or 70 cents per bale.

## ABSTRACTS FROM REPORTS.

(Abstracts from the reports, respectively, of H. L. Douglass and W. H. Nelson have been given on pages 18 and 19, under "Bluff region".)

JAMES STEWART (county generally).—The upland varies little, and the level and plateau-like portions are as fine as need be. Rolling lands require to be protected by circling, plowing, and ditching. The low areas are extremely rich. All kinds of soils are put in cotton, which is cultivated all over the county. The original soil is 12 inches or more in thickness, resting upon a yellow, heavy clay loam, averaging 4 feet in depth, very rich and fertile when broken up, sometimes leachy and sometimes impervious. The subsoil is underlain by sand and gravel. The land is easily tilled at all times, and is well adapted, with fair culture and attention, to any crop suited to the climate. About one-half of the aggregate crop of the county is cotton. The plant grows from 1 foot to 5 feet, the higher the better. The seed-cotton product per acre on fresh land is from 1,000 to 1,700 pounds, 1,720 pounds being required for a 475-pound bale. The staple is first class. On our worst land the product per acre is 350 pounds, requiring five times that much for a bale. The staple is short and inferior. We have no weeds worth noticing. Two-thirds of the land lies turned out; but such land produces as well as ever when it regains freshness, but it is often allowed to go into gullies. The soil washes badly on slopes—to the improvement, however, of the valleys. Efforts are made to check the drainage by horizontalizing and hillside ditching, and is our only chance for working rolling land.

Dr. S. HAMMONTREE and Dr. W. D. TUCKER (civil district No. 4, lands of Big creek).—The soils cultivated in cotton are the clay loam of the uplands and the alluvial. The clay loam is found on all the uplands, and forms about two-thirds of the lands. It extends west to the Mississippi bottom, east 10 miles, and has a thickness of from 6 to 8 inches. Sand and gravel occur at from 30 to 60 feet below the surface. The soil is easily tilled in dry weather, and is early and warm when well drained. It is apparently best adapted to cotton, in which two-thirds of it is planted. Cotton attains a height of from 2 to 5 feet, 3 and 4 feet being the most productive. To favor bolling some farmers remove the dirt, and some top the plant. The seed-cotton product per acre is from 1,000 to 1,500 pounds, about 1,500 pounds being needed for a 475-pound bale, which rates as middling. After ten years' cultivation level lands (unmanured) will make from 1,000 to 1,200 pounds, about the same as before being required for a bale. The staple on fresh land is longer and coarser; on old land shorter and finer. Very little land lies turned out. In the southeastern portion of the county, however, that turned out amounts to from 10 to 20 per cent. Such land, if again cultivated, produces very well. The soil washes seriously on slopes, very much to the injury of the valleys. Circling has been done to check the damage, with very good results.



## THE BROWN-LOAM TABLE-LANDS.

This subdivision includes the following counties: Fayette, Hardeman, Haywood, Madison, Crockett, Gibson, and Weakley, together with large parts of Henry\* and Carroll,\* and very small parts of the counties mentioned below. The first seven only, called "midland counties", are considered here. Carroll and Henry are referred to in the next group. On the west the southeastern corners of Obion, Tipton, and Shelby, and on the east the northwestern corners of Henderson and McNairy, project into this area, but the parts thus included are inconsiderable.

## FAYETTE.

*Population:* 31,871.—White, 9,633; colored, 22,238.

*Area:* 640 square miles.—Woodland, all.

*Tilled lands:* 197,516 acres.—Area planted in cotton, 92,231 acres; in corn, 63,419 acres; in wheat, 3,737 acres; in oats, 3,661 acres; in tobacco, 66 acres.

*Cotton production:* 39,221 bales; average cotton product per acre, 0.43 bale, 606 pounds seed-cotton, or 202 pounds cotton lint.

Fayette county ranks next to Shelby in the number of bales of cotton produced in 1879, both being much ahead of any other county, and makes the best showing of all upon the map of acreage in cotton. The large tract of upland country in the southeastern corner of the state, bounded on the north and east by the Big Hatchie river, is noted for its great fertility. Of this area, Fayette county is nearly the central as well as an important part. The county is traversed by the Loosahatchee and Wolf rivers, and is well supplied with smaller streams. Much of the surface is level or moderately undulating. The western part is inclined to be hilly, with extended plateaus; the southeastern portion is more hilly, but with fertile valleys. In the southern portion the valley of Wolf river affords much alluvial land in its extended bottoms.

The formation underlying, and in great part giving character to the soils and subsoils of the uplands, is the orange-sand drift, a series of sands, clays, and sometimes gravel. Below the drift are strata more clayey, which, when the former is absent, yield stiffer soils with less sand. The soil of the higher lands is a mellow, warm, siliceous, or sandy loam, well suited to a variety of crops. It is readily washed on the slopes, and requires judicious management. The valleys supply a fair proportion of alluvial lands. The forest growth of the uplands is oak, walnut, poplar, and hickory, often of great size; of the bottoms, white and overcup oaks, beech, red and black gum, birch, and, along the streams, cypress. Shipments are made to Memphis at from \$1 50 to \$2 25 per bale.

The reports obtained from the county refer chiefly to particular regions, and two are confined to the Wolf river country. No report containing an adequate description of the upland soils in general was received. The characteristics of these, however, are much the same as those of the upland soils of the parts of Hardeman and Haywood counties contiguous.

## ABSTRACTS FROM REPORTS.

J. B. THORNTON AND A. L. PEARSON (southwestern corner of the county, creeks of Wolf river).—The uplands in this region are rolling, and are locally known as "ridge land", little of them being sufficiently level to be called table-land. The soils cultivated in cotton are: (1) Creek bottoms; (2) ridge land; (3) "buckshot" clay land. The chief soil is the creek bottom, which forms one-half of the lands, occurring with little variation in all directions. It is generally a yellowish, sometimes dark, sandy loam, about 8 inches thick, and rests upon a sandy yellow clay, which changes to a lighter color upon exposure to the air, and is in most places leachy. Strata of sand are met with at from 20 to 60 feet. The soil is easily tilled at all times, and is early, warm, and well drained. The crops produced are cotton and corn, two-thirds of the land being planted in the former, which grows to a height of from 3 to 3½ feet, but corn is the most productive crop. Cotton runs to weed in wet weather, which can be remedied by throwing dirt from the roots or "barring off". On fresh land the seed-cotton product is 800 pounds per acre, requiring 1,600 pounds for a 475-pound bale, which rates as middling. After three years' cultivation the product is 750 pounds, the same amount being required for a bale, and the staple remaining the same. The troublesome weeds are cocklebur and morning-glory vines. But little of the land lies turned out, and such land produces as well as ever when cultivated again.

The "ridge land" or upland soil makes one-half of our lands, and extends off indefinitely in all directions. The growth is oak, gum, hickory, poplar, etc. It is a sandy clay from 4 to 5 inches thick, resting upon a yellow clay subsoil, with sand below at from 20 to 40 feet. The soil is easily tilled in all seasons, but is sometimes inclined to run together and bake. It is early, warm, naturally well drained, and is best adapted to cotton, in which two-thirds is planted. The cotton grows to a height of 2 feet, and at this is most productive. When fresh, it produces 750 pounds of seed-cotton per acre, 1,600 pounds being required for a bale of 475 pounds. After three years' cultivation it produces from 500 to 750 pounds, the same amount making a bale. The weeds are crab-grass and fox-tail. One-fourth of the land lies turned out, and is owing more to want of hands than to anything else. Such land produces well when again cultivated. It washes seriously on slopes, much to the damage of the lower grounds. Some hillside ditching has been done with good success.

Of the "buckshot" clay loam there is but little. It is white or gray, with an impervious clay subsoil, contains soft gravel-like particles, and in dry seasons produces cotton well.

A. D. LEWIS (southeastern part of the county, Wolf river lands).—On the west of Wolf river are the fine alluvial lands, but they are low and late, and their crops are liable to be caught by frost. The best cotton land is the black sandy upland—a prairie soil lying mostly on second bottoms and slopes. It forms one-fourth of our lands, and occurs on creeks and along rivers in long strips a fourth to half a mile wide. Its subsoil is sandy and leachy. Two-thirds of the land is planted in cotton, which grows to a height of 3 and 4 feet, the latter being the most productive. On fresh land the seed-cotton product is from 1,000 to 1,200 pounds per acre, and after eight years' cultivation from 600 to 800 pounds. On bottoms, after eight years, the product is from 1,000 to 1,200 pounds. Twenty-five per cent. of this land lies turned out. Such land, when again cultivated, does well for two or three years. On our flat lands we have a white pipe-clay, which is impervious to water.

J. M. GALLAWAY (northwestern part of the county, Cane Creek alluvial region).—The soils are the black alluvial, with here and there crawfishy lands, the latter a white gravelly kind. These make up all our lands. Similar lands are found elsewhere in Fayette, and also



in Tipton and Shelby counties. The growth is poplar, oak, gum, hickory, ash, walnut, elm, and dogwood. The soil is a loam with but little clay. One-half the land is planted in cotton, of which the tallest, though not always the most productive height, is 5 feet. The seed-cotton product on fresh land is 1,600 pounds per acre, requiring 1,545 pounds for a 475-pound bale, which rates as middling and fair. After ten years' cultivation we can see but little difference. Cotton is generally better on lands that have been cultivated for three or four years. About 10 per cent. of the land lies turned out.

# HARDEMAN.

*Population:* 22,921.—White, 13,313; colored, 9,608.

*Area:* 610 square miles.—Woodland, all.

*Tilled lands:* 120,437 acres.—Area planted in cotton, 44,885 acres; in corn, 45,207 acres; in wheat, 4,758 acres; in oats, 2,554 acres; in tobacco, 84 acres.

*Cotton production:* 18,937 bales; average cotton product per acre, 0.42 bale, 600 pounds seed-cotton, or 200 pounds cotton lint.

Hardeman is one of the southern tier of counties, and lies immediately east of Fayette. Its central and western portions are generally level or moderately rolling. The northern part is more broken, but includes many level areas. The eastern and southern portions are more or less hilly, but include many good farming sections. The county is remarkably well and symmetrically watered. The Big Hatchie flows diagonally through it from the southeastern corner to the northwestern, splitting the county into two triangular sections. Into the Hatchie, as the main channel, the numerous tributary creeks, with courses mostly at right angles to the river, pour their contents. Thus the two parts of the county, separated by the valley of the Hatchie, are each cut up into sections by the parallel valleys of the creeks. The streams afford along their borders a large aggregate of rich alluvial land, with which, at intervals, stiff crawfishy areas occur.

The prevailing upland soil, the most important in the county, is a rich, mellow, siliceous loam, warm and early, resting upon a reddish yellow, sandy clay, the underlying formation being the orange sand. It is found all over the county, but spreads out most uniformly in the western and northwestern parts—parts which belong to the area of the highest percentage yield of cotton. In the eastern and southeastern sections of the county, in addition to lands such as have been noticed, are others more clayey and some quite calcareous. These are based upon the outcrops of formations below the orange sand.

The growth of the chief soil, the siliceous loam of the uplands, is in the more level parts of Hardeman red, white, and post oaks, hickory, walnut, wild cherry, dogwood, red-bud, and in the western part black-jack oak. In the more hilly portions, the southwestern, southern, and northeastern, black-jack and Spanish oaks and chestnut are found. The growth of the lowlands is beech, white and red oaks, sweet and black gums, poplar, hackberry, red-bud, cane, and others. Areas of yellow pine occur in the northeastern and eastern portions. Cypress is met with along the streams. Shipments of cotton are made to Memphis at \$2 and \$2 10 per bale.

## ABSTRACTS FROM REPORTS.

H. M. POLK (lowlands and uplands of Spring creek and Hatchie river).—Our uplands vary but little, often affording thousands of acres suitable for cultivation. On account of late and early frosts the uplands are preferred for cotton. The counties in the southwestern part of Tennessee, having generally a soil of rich siliceous loam, are the best for cotton. The soil, which is warm and matures the crop earlier than elsewhere in the state, has been described in Part I. Probably one-fourth of the land once cultivated lies turned out. Time, aided by weeds, broom-grass, *Lespedeza striata*, etc., restores its capacity for half a crop. It washes and leaches very easily, and on slopes seriously, to the injury of the valleys. Horizontalizing and hillside ditching have been practiced by all farmers for the saving of the soil.

The siliceous or the sandy loam of the bottoms of Spring and Pleasant Run creeks form about a twentieth of the lands, and occurs throughout the valleys of the two streams named. Its timber is white and red oaks, beech, red-bud, hackberry, etc. It is of gray, buff, and brown colors, 12 inches thick, resting upon a subsoil of yellowish clay, thought not to be so rich as the red clay subsoil of uplands. It is easily cultivated in dry seasons, is late and well drained, and is best adapted to corn. One-fourth is planted in cotton, which grows to a height of 3 or 4 feet. The plant inclines to run to weed in warm, wet seasons, when the land is fresh. The remedy is shallow cultivation after deep breaking of the soil in the spring. The seed-cotton product on fresh land is from 600 to 700 pounds, requiring from 1,545 to 1,750 pounds for a 475-pound bale. The staple rates high. After twenty years' cultivation the yield is about the same, the staple being shorter. Crab-grass is troublesome. Very little of this land lies turned out. Rest improves a land.

The heavy soil of Hatchie river, mostly above overflow, is a sandy loam similar to that of the uplands, but colder, and makes about a twentieth of our lands. Its timber is white oak, beech, gum, and cane. The soil is a brown or blackish clay loam, 24 inches thick, and rests upon a subsoil of yellowish clay, containing fine white sand. In tilling qualities, crops, proportion, and height of cotton, as well as in seed-cotton product, it is much like the soil described.

O. B. POLK (western part of the county).—The soils cultivated in cotton are: (1) Mellow siliceous upland loam, varying but little; (2) sandy loam bottom lands of Dry creek; (3) gravelly land in small spots of 1 or 2 acres. The chief is the mellow siliceous soil, comprising three-fourths of the lands. It extends north 8 miles to Whiteville, south 15 miles to the state line, west 2 miles to Fayette county, and east 5 miles to Spring creek. Its growth is red, black-jack, post oaks, and hickory. It is a fine sandy dark-colored loam 5 inches thick, resting upon red clay, which, when mixed with the soil, produces well. Sand is met with at from 6 to 10 feet. It is easily tilled in wet or dry seasons, and is early, warm, and well drained. Its chief crops are cotton and corn, but it is best adapted to cotton, three-fourths of the land being planted with this staple. The plant grows to 3 feet, its most productive height. The seed-cotton product per acre on fresh land is 1,250 pounds; on land cultivated for ten years, from 600 to 700 pounds. In the first case, 1,660 pounds are generally required for a 475-pound bale; in the second, 1,780 pounds. Cotton marketed at home is not sold on the basis of staple, but as to cleanliness and freedom from trash. Crab-grass is our enemy. But little of the land lies turned out, say one-fifteenth. Such land, when taken in again, produces well for three or four years. On slopes the soil washes seriously, to the injury of the valleys.

The *sandy loam of Dry creek* forms only one twenty-fifth of our lands. It occurs throughout the area embracing the first soil. Its growth is red oak and hickory. One-third of it is planted in cotton, which attains a height of 4 feet.

The *gravelly land*, of which there is about 1 per cent., occurs in small spots, containing an acre or two each, scattered through the area indicated above for the others. Its growth is persimmon, Spanish oak, and sweet gum. It produces fine cotton when properly drained.

## COTTON PRODUCTION IN TENNESSEE.

J. A. MANSON AND E. E. LOW (southwestern corner of the county).—The kinds of soils cultivated in cotton are: (1) Mahogany clay (siliceous) loam; (2) black sandy loam; (3) light sandy loam. The chief soil is the mahogany clay soil, which forms four-fifths of the land in this region. Its timber is oak of many kinds, hickory, and chestnut. On the lowlands are poplar, beech, and sweet and black gums. (Description agrees with that given by O. B. Polk.)

The *black sandy loam* constitutes a fifth of our lands. Cotton is planted on two-thirds of this soil, yielding from 1,000 to 1,500 pounds of seed-cotton per acre. The staple rates first class.

The *light sandy loam* forms a twentieth of the lands in this region. Six miles to the northeast and southeast there is much of it. Its growth is black-jack, scrub oak, scrub hickory, and chestnut. It rests upon a subsoil of gray clay, mixed with sand. One-half is planted in cotton, which grows from half a foot to 2 feet in height, yielding from 400 to 600 pounds of seed-cotton per acre. The staple is first class. Two-thirds of the land lies turned out. It washes seriously, to the great injury of the valleys.

WILLIAM RUSH (region northeast from Bolivar, Piney Creek lands).—The upland soils, in patches of from 1 acre to 10 acres, vary greatly from ridge to ridge as to kind and productiveness. The bottoms also vary much. In wet seasons the cotton in bottoms is too late; in dry, it does well; but good upland is considered the best. The soils in cotton are: (1) Black sandy and clay upland; (2) piny bottom land above overflow; (3) crawfishy or white gravelly bottom land. The principal soil is the black sandy and clay upland, about one-fifth of the tillable land, and occurs in patches from the headwaters of Piney creek to the Hatchie river. Its growth is red, black, and Spanish oaks, walnut, and in places yellow pine. It is a fine sandy loam 5 inches thick, and rests upon a yellow clay subsoil, which is mixed with sand, and works well after exposure. Sand is met with at 10 feet. The soil works more easily in wet seasons than that of any other land. Its crops are corn, cotton, wheat, and oats, to all of which it is well adapted. About one-fourth is planted in cotton, the plant growing to 3½ feet. The seed-cotton product per acre is 1,000 pounds, requiring 1,485 pounds for a 475-pound bale; it rates as middling. After ten years' cultivation, if the land is kept from washing, the yield is 800 pounds. Of this 1,545 pounds are required for a bale, the staple differing little. The weeds are cocklebur and crab-grass. One-fourth of the land lies turned out, but little of it being cultivated again. It washes readily on slopes, but has not as yet seriously injured the valleys. Horizontalizing and hillside ditching have been practiced, and with good results where kept up.

The *piny bottom land* forms about one-half of the tillable land, and occurs throughout the length of the valley of Piney creek. Its growth is white oak, gum, beech, poplar, and ash. It is a sandy clay loam, early and warm when well drained, 8 inches thick, with a yellow clay subsoil. It is tilled with difficulty in wet seasons, but very easily in dry. It is best adapted to corn and cotton. About one-fourth is planted in cotton, which grows to 4 feet. Too much rain inclines the plant to run to weed. Our remedy is to turn out the middles with the turning-plow. The seed-cotton product on fresh land is 1,000 pounds per acre; on land worked for twenty-five years it is 800 pounds in good seasons. The staple in both cases rates middling. The weeds are cocklebur, smart-weed, rag-weed, and crab-grass. None of this land lies turned out.

The third soil, the *crawfishy*, forms about a fourth of the bottom lands. It occurs throughout the valley of Piney creek, and there is hardly a 10-acre field but that has some of it. Its timber is gum, maple, beech, etc. It is a gravelly, whitish to blackish clay loam, sometimes putty-like, 5 inches thick, with a subsoil of a lighter color. The subsoil, when at the surface, is nearly white; is impervious when undisturbed. The soil is late, cold, and ill drained, tolerably well adapted to cotton, in which one-fourth is planted. The plant usually grows to 3½ feet; in wet seasons to 5 feet. The seed-cotton product on fresh land is about 800 pounds per acre; on land worked for fifteen years, 700 pounds. In both cases it rates middling, and 1,545 pounds are required for a bale. The weeds are smart-weed, rag-weed, and cocklebur. None of this land lies turned out.

## HAYWOOD.

*Population*: 26,053.—White, 8,497; colored, 17,556.

*Area*: 570 square miles.—Woodland, all, excepting a few small lakes in the Hatchie river bottom.

*Tilled lands*: 137,155 acres.—Area planted in cotton, 49,919 acres; in corn, 39,878 acres; in wheat, 5,326 acres; in oats, 2,976 acres; in tobacco, 62 acres.

*Cotton production*: 23,092 bales; average cotton product per acre, 0.46 bale, 660 pounds seed-cotton, or 220 pounds cotton lint.

Haywood county ranks third in the number of bales of cotton produced in 1879. Two-thirds of the county lies in the area having the greatest percentage of acreage in cotton. Little variety comparatively is presented in its surface and soil. It is a plateau region, traversed in its southern part by the Hatchie river, and having the South Forked Deer along its northern boundary. These rivers have numerous tributary creeks well distributed through the county. Much of Haywood is a water-shed lying between the Hatchie and South Forked Deer, with gentle slopes, yet embracing large areas of level lands. The chief soil is that of the uplands, a fine, dark, siliceous loam, warm, easily tilled, and extending pretty well over the county. It is mellow, readily washed, and requires careful culture. In some sections the land has been overworked or carelessly worked, and is badly worn or washed. The subsoil is usually a reddish clay, below which lie, at various depths, strata of sand, interstratified occasionally with beds of clay. The growth is white, red, and black oak, poplar, walnut, hickory, ash, dogwood, with papaw and hazel-nut. The creek valleys and the second bottoms of the rivers afford many tracts of valuable land. The second bottoms, lying on the north side of the Hatchie, are noted for their productiveness. The first bottoms of the rivers, as well as of many creeks, making in the aggregate a large area, are subject to annual overflows. Cotton is shipped by rail to Memphis at \$2 25 per bale, or by water at \$1 50; to Jackson, \$1 per bale.

## ABSTRACTS FROM REPORTS.

AARON WALKER (county generally).—The soil of the uplands was originally a black, light loam, and all of it was tillable. The first river bottoms are subject to overflow, and are not in cultivation. Cotton on lowlands and on fresh, rich soil is liable to be caught by early frost. We prefer good upland. (For kinds, extent, growth, etc., of soil, as reported, see Part I.) The first, the *black upland loam*, is usually not troublesome either in wet or dry seasons. Cotton is the chief crop, but corn and wheat are raised, with some clover and oats. The soil is adapted to any of these when well managed. From one-half to two-thirds of the land is planted in cotton, which attains a height on the first soil of 4 or 5 feet, and on the second and third soils of 1½ to 3 feet; it is most productive at 4 feet. The plant inclines to run to weed on fresh land in wet seasons. There is no certain remedy; early planting should be practiced. The seed-cotton product on fresh land is from 1,200 to 1,500 pounds, 1,545 pounds being required for a 475-pound bale. Staple rates with the best. After five years' cultivation

the product is from 1,000 to 1,200 pounds, but much depends upon the season and cultivation. The staple compares favorably with that of fresh land. Crab-grass and careless-weed are the most troublesome. One-tenth of the land lies turned out. Such land, after a crop of pease, and when well circled, will produce well when again cultivated. It washes readily on slopes, the valleys being rather benefited thereby. Horizontalizing and hillside ditching have been practiced with good results where well done and when in time.

F. A. LORD, J. W. KERR, AND DR. H. C. ANDERSON (central, western, and northwestern parts of the county).—The lands of this region in their virgin state were covered with the wild pea-vine and but few bushes. The soils cultivated in cotton are: (1) Upland soil, a light sandy loam, with a clay foundation, very tender and easily washed, not showing sand in excess, as in Madison county; (2) bottom soil, a heavy mixture of loam and sand when good; when not so good, pipe-clay and gravelly loam; (3) the poorest, a stiff white clay, but productive when well drained. The first, the *upland soil* or *loam*, is the chief soil, and forms about two-thirds of the upland, or, including the bottoms of the Hatchie and Forked Deer, one-half the lands. The growth on the best cotton land is black oak, hickory, a few poplars, and some white oak; near the rivers, on second bottoms, poplars and large red oaks predominate. The soil is dark colored, and contains small and soft blackish pebbles, which crush easily. At 40 feet a stiff clay is met with, then sand or white and yellow gravel and hard and smooth sandstone. The chief crops are cotton, corn, wheat, sorghum, Irish and sweet potatoes, oats, etc. The soil suits all of them. About four-sevenths of the land is planted in cotton. The seed-cotton product is from 1,000 to 1,600 pounds per acre, of which from 1,485 to 1,840 pounds, depending partly upon the year, are required for a 475-pound bale. After twenty-five years' cultivation the product is from 250 to 350 pounds, but with a little manure it may be doubled. Crab-grass is our worst enemy. Three-tenths of the land lies turned out so far as I can judge. Such land taken in again is the very best for cotton when well managed, but does not hold out more than two years. It washes badly, the great trouble in West Tennessee. The valleys are not always injured thereby. We check the damage mostly by circling, with sufficient fall. It requires thought and tact to do it well, but the results are the very best.

The *glady soil*, of which there is but little, has a growth of white and post oak. Cotton is generally planted upon it, but the yield is uncertain. The land is flat, and does not wash.

HENRY WILLIAMS (northwestern part of the county).—The soils cultivated in cotton are: (1) Black soil with little sand, loose and soft; rolling upland; (2) black, with small black gravel; no sand; (3) level, white gravelly land, cold, wet, and late. The first is the chief soil. One-half of the land is of this kind. It is suited to corn and cotton, two-thirds being planted in the latter. The soil is from 4 to 12 inches thick, and rests upon a hard, rather sticky red clay subsoil. The seed-cotton product is from 800 to 1,200 pounds, requiring from 1,425 to 1,780 pounds for a 475-pound bale. The second soil is somewhat rolling, and forms about one-third of the lands. It is much like the first soil. About one-half is planted in cotton. The third soil forms about one-sixth of the lands, its chief growth being the post oak, and nearly all of it is planted in cotton, which grows to a height of from 3½ to 4 feet. The seed-cotton product per acre is from 500 to 1,000 pounds. The land remains the same for years. There are no slopes, and hence there is no washing.

H. M. CLARKE AND J. B. BRANTLY (eastern part of the county, between the Hatchie and Forked Deer rivers).—The soils cultivated in cotton are: (1) Fine sandy loam, easily cultivated, and if well circled will not gully badly; (2) a deep, dark, slightly sandy loam of creek bottoms; on this, unless old, cotton grows too rank and matures too slowly; (3) soil mixed with pipe-clay, also of the bottoms; very tenacious, and when wet, very wet; when dry, hard, tough and lumpy in breaking up; drained and broken up, will make the very best cotton in a dry year. The first is the chief kind, forming three-fourths of our ridge land. It extends 5 miles to the west, and from the Forked Deer river, through Madison and Hardeman, to Bolivar county. It is 3 inches thick, and is underlaid by reddish, more tenacious clay, and contains some gravel. Gravel and rock are found at from 5 to 10 feet. Nearly one-half of the land is put in cotton, which grows to 3 feet, the most productive height. Cotton runs to weed when not brought to a stand early and is too wet and badly cultivated. Our remedy is early thinning, good cultivation, and shallow plowing. The seed-cotton product is 1,400 pounds per acre, 1,660 pounds making a bale of 400 pounds. On land worked for twenty-five years the product is 500 pounds, 1,300 pounds making a bale. The staple on the old land is slightly better. The only weed seriously troubling us is crab-grass. About one-fourth of the land lies turned out. It produces finely when taken in again, if properly cared for and green manure is turned under before seeding.

The *bottom or swamp lands* are in small proportion. The bottom of the Forked Deer river averages a mile in width. Some of this land lies on creeks. The soil is blackish, a part whitish or gray, from 6 inches to several feet in thickness. The subsoil is generally sandy clay; in places clay and gravel. But very little of this land is cultivated. When protected from overflow the land produces corn, cotton, and grasses well.

J. M. SHAW AND PROFESSOR JOSEPH NELSON (eastern part of the county).—Our soils are: (1) The chocolate-colored, undulating hazel-nut plains, the most important and best; (2) white clay loam, adjoining uncultivated bottoms. The soil of the plains or gently rolling uplands form three-fourths of our tillable area, including all the more valuable lands. It extends widely over West Tennessee. The subsoil under the hazel lands is clayey and easily gullied, and contains frequently water-worn pebbles. About three-fourths of the land is planted in cotton. The best height of the plant is 4 feet, which it usually attains. The slopes wash seriously. Horizontalizing is practiced with marked success. In certain more rolling sections one-tenth lies turned out.

The *white clay loam* occurs along all our streams, and, excepting in Hardeman county, where there is more sand, along all the streams in this end of the state. Post oak is the unfailing characteristic growth. The soil is a clay intermixed with buckshot gravel. Cultivation has disclosed no difference between soil and subsoil, save its hard-pan and impervious character. Not much of it is planted in cotton. The plant grows to 3 feet in height. The seed-cotton product is about 1,500 pounds per acre, which is greater after a few years' cultivation, but never equals that of the uplands. Washes from the slopes improve this land.

There is much of the impoverished hazel plains. In Haywood the clay washes easily, and is wasting. The timber was taken off long ago. The negro hands go over it and raise a little low cotton. It never goes to weed; we would that it might.

## MADISON.

*Population:* 30,874.—White, 15,406; colored, 15,468.

*Area:* 580 square miles.—Woodland, all.

*Tilled lands:* 125,693 acres.—Area planted in cotton, 45,825 acres; in corn, 46,885 acres; in wheat, 9,623 acres; in oats, 3,157 acres; in tobacco, 67 acres.

*Cotton production:* 19,257 bales; average cotton product per acre, 0.42 bale, 600 pounds seed-cotton, or 200 pounds cotton lint.

Madison is one of the four counties forming the central area of West Tennessee, the others being Haywood, Crockett, and Gibson. It is nearly square in shape, and, like Hardeman, is cut diagonally by a river into two triangular sections. These sections are nearly equal. The river is the South Fork of the Forked Deer river, running northwestward from the southeastern to the northwestern corner of the county. The Middle Fork of the Forked Deer

river runs through and drains the extreme northern portion of the county, while the creeks of the Big Hatchie drain the southwestern. For the greater part the drainage of the surface is into the valley of the South Fork. From the disposition of the waters of the three rivers, the area of the county is made to consist generally of two wide dividing belts of uplands, with the South Fork between and the two slopes of the other streams to the north and the southwest respectively. There are many creeks, some of which are of large size, such as Little Middle Fork, Johnson's, and Cypress. In the main, the surface is a level or undulating table-land. The eastern and southern portions, however, have very rolling or hilly sections. Low ridges, with thinner soils, are sometimes met with on the table-lands.

The deepest strata are beds of usually dark stratified sands and clays. These are mostly covered and concealed by the more superficial deposits of the orange sand. Some of the underlying clays outcrop in the eastern and southeastern parts of the county, giving origin to strips of stiff argillaceous soils. The soil of the uplands is very generally a mellow siliceous or sandy loam, brown when fresh, early, warm, and well suited to cotton culture. It is based on a reddish or sometimes yellowish sandy clay subsoil. The gentle slopes, bottoms of the smaller streams and second bottoms of the larger, afford much good land. The bottoms of the rivers are low, flat, in great part subject to overflow, and are unfit for cultivation. The growth of the uplands includes white, Spanish, black, red, and post oaks, hickories, ash, poplar, mulberry, dogwood, walnut, beech, and in different sections a smaller growth of papaw and hazel-nut. On the poorer ridges are black-jack, post oak, hickory, and some chestnut. The valleys of the branches and the second bottoms of the larger streams supply "poplar", sweet gum, red and white oaks, hickories, maple, walnut, mulberry, ash, sassafras, dogwood, and papaw; and the river bottoms beech, sweet gum, overcup and other oaks, ironwood, hornbeam, shell-bark hickory, maple, poplar, cypress, holly, and tupelo-gum. Cotton is the great crop. Most of the county lies within the greatest percentage belt of acres in cotton, there being 15 per cent. or more of the total area planted in cotton. The remainder of the county (strips to the northwest and southeast) has from 10 to 15 per cent. in cotton. Cotton is shipped by rail to Memphis or Mobile at about \$3 per bale.

#### ABSTRACTS FROM REPORTS.

G. C. BUTLER AND S. M. OSIER (southeastern part of the county, lands of the Forked Deer and its branches).—The uplands vary from slightly rolling to hilly. The soil is in patches of a few acres to 40 and 50 acres. Uplands are preferred, on account of early frosts. The soils planted in cotton are: (1) Dark upland, on ridges, slopes, and level fields; (2) dark sandy soil of the valleys of the Forked Deer river and the branches above overflow; (3) black, muddy, and sandy soils of these streams. The *dark upland* is the chief soil. Three-fourths of the cotton is raised on such land, a fine sandy loam from 3 to 5 inches thick, and early in dry springs when well drained. The chief crops are corn and cotton first; then wheat, oats, rye, and pease; but the soil is best adapted to corn and pease, though other crops do well. Cotton comprises about three-fifths of the crops, and grows to 2 or 5 feet, but is most productive at 3 or 4 feet. The plant inclines to run to weed on rich, fresh lands when the late summer is wet. Manure favors bolling. The seed-cotton product per acre on fresh land is from 800 to 1,200 pounds, 1,660 pounds being required for a 475-pound bale. The staple is middling and low middling. After twenty years' cultivation the product is from 300 to 1,000 pounds, and the staple about the same. Smart-weed and others abound on good land, but grass is the worst. One-fourth of the land lies turned out, and when taken in again does tolerably well if level and not washed in gullies. The soil washes seriously on slopes, often to the injury of the valleys. Horizontalizing has been practiced with good success where well done.

The *dark sandy soil of the valleys* varies in places and on different sides of the streams. It is from 6 to 8 inches thick. Two-thirds is planted in cotton, which grows to a height of 4 or 6 feet, but is best at 4 or 5 feet. The seed-cotton product per acre on fresh land is from 800 to 1,200 pounds, 1,660 pounds making a 475-pound bale. Staple is middling. After twenty years' cultivation the product and staple are about the same. The weeds are smart-weed, cocklebur, and other kinds. Very little lies turned out, and where taken in again it has done well. The washing of the soil, the damage done, and the remedy applied are the same as with the first soil.

The *black sandy soil of the bottoms* forms about one-fourth of our lands, and varies on different sides of the streams like soil 2. It is in the main a fine sandy loam, dark grayish in places, sometimes gravelly, with here and there a clay loam. Cotton grows to 5 or 6 feet. Seed-cotton product per acre on fresh land is from 1,000 to 1,200 pounds when favorable. The staple is middling and low middling. The product on land after twenty years' cultivation is nearly as much as on fresh land.

JOHN Y. KEITH, JOHN J. BOON, AND THOMAS INGRAM (lands of creeks and Forked Deer river).—Early frost is our most serious trouble. A variety of cotton maturing a month earlier than what we have would increase the crop at least one-third. The soils cultivated in cotton are: (1) The table or upland, most reliable, but differing in short distances; (2) creek and branch bottoms; (3) river bottoms. The chief soil is the upland, forming perhaps nine-tenths of our land, and extending, with considerable variation, through most of the county. It is a dark loam, with a little sand, is from 4 to 10 inches thick, and rests upon a sandy, generally yellow, sometimes reddish, clay subsoil. The subsoil is occasionally gravelly or mixed with coarse sand. If hard-pan, it is marked by pools of waters. Tillage is more difficult in wet than in dry seasons.

The soil is best adapted to corn, but produces cotton, wheat, oats, rye, pease, potatoes, peanuts, clover, etc. About one-half the crop is cotton, which grows to 3 and 4 feet, but is best at 3½ feet. We restrain the plant by topping it about the 12th of August. The seed-cotton product per acre on fresh land is from 800 to 1,000 pounds, from 1,485 to 1,660 pounds making a bale of 475 pounds. It rates as other cotton. On land worked for thirty years the product is from 500 to 700 pounds, a bale requiring the same as before, with no difference in staple. The weeds are crab- and foxtail-grasses, rag-weed, cocklebur, smart-weed, iron-weed, white bloom, golden rod, and others. Ten per cent., perhaps, lies turned out; but where taken in again, unless injured by washing or the tramping of stock, it has produced well. It washes seriously on slopes, many fields being nearly ruined and the valleys injured. Horizontalizing and hillside ditching have been practiced, but not with uniform success, as great rains break over and flood the lower lands, doing great damage.

A. D. HURT (western part of the county, lands of Johnson's and Cub creeks and Forked Deer river).—The area reported covers a space 3 miles wide and 6 miles long, on which more cotton is raised than in any other section of the county. For cotton growing we need a dry June; then some rain from the 1st to the 15th of July; then mostly dry weather for a month for blooming and fruiting. The chief soil, *black sandy upland and second bottom*, commonly designated "table-land", and covering three-fourths of the county, is early, warm, and well drained. Its crops are cotton, corn, wheat, etc. Cotton forms about three-fifths of the crops, and attains a height of 4 or 5 feet; warm rains and keeping the crop clear of grass incline the plant to run to weed. We restrain this by throwing dirt from the roots with a small shovel-plow, care being taken not to check too suddenly. The seed-cotton product per acre on fresh land is, in good seasons, from 1,000 to 1,500 pounds, from 1,485 to 1,780 pounds being required for a bale of 475 pounds. Staple rates good middling. After ten years' cultivation, if crops have been properly alternated, the land will produce as good cotton, if not better, than when fresh. Crab-grass is the troublesome weed. I know of none of this land turned out. The washing on slopes is not serious, and the valleys have been injured about 3 per cent. Horizontalizing and hillside ditching have been practiced with favorable results.

The *black-jack ridges*, occurring to the east and southeast, form about a fifth of the lands. The soil is from 1½ to 2 inches thick, and rests upon a red clay containing more or less sand. Below this again is sand at from 15 to 40 feet. The soil is best adapted to cotton, in which about two-fifths is planted. The cotton attains a height of 3 feet, and rarely runs to weed. The seed-cotton product per acre on fresh land is from 350 to 700 pounds, of which from 1,600 to 1,800 pounds are required for a 475-pound bale. After ten years' cultivation the product amounts to little or nothing. One-third lies turned out, and such land is seldom taken in again. It washes seriously, to the injury of lowerlands. Horizontalizing and hillside ditching have been tried with unsatisfactory results, the land not justifying the labor.

The *buckshot and crawfishy soil* forms about one-fifth of the lands. It is about 3 inches thick, rests upon a whitish clay subsoil with little sand, which becomes hard upon exposure to the sun; is impervious, contains some gravel, and is underlaid by sand at from 25 to 40 feet. The land is best adapted to grasses. One-tenth is planted in cotton, yielding from 350 to 500 pounds of seed-cotton per acre. Cultivation for a number of years increases the yield.

E. C. HARBERT AND T. C. LONG (western part of the county, lands of Cypress and Johnson's creeks and Forked Deer river).—This region is one of the best for varied crops. With fertilizers and proper cultivation we can make a bale of cotton of 500 pounds to the acre, the only drawback being the shortness of the season. The soils are: (1) The brown, fine, loamy soil of the second bottoms and table-lands, the most reliable; (2) soil of hill or ridge land, as productive as the first, of the same color, but more worn; (3) bottom and swamp land and greenbrier glades, of little value except for timber. The chief soil is the first mentioned, which comprises one-third of the lands and extends through Madison and other counties, and rests upon a subsoil which changes to a deep yellow or red clay at a depth of from 4 to 5 feet. Its crops are corn and cotton, but it is best adapted to corn. More than one-half is planted in cotton, which attains a height of from 2 to 5 feet; but 3 or 4 feet is the best. The seed-cotton product per acre on fresh land is from 1,200 to 1,500 pounds, 1,780 pounds making a bale of 475 pounds. On land worked for ten years the product is from 800 to 1,000 pounds. It rates middling in both cases. Over one-third of the land is turned out. Such land taken in again produces well after the first year. It washes seriously on slopes, sometimes to the ruin of the valleys. Not much horizontalizing has been done since the war. When properly done the results are good. The second soil forms more than a third of the land, and like the first spreads over several counties. It is from 6 to 10 inches thick, and rests upon a subsoil which is yellow at first and then changes to red. Some of the subsoil is impervious; sand lies below at from 10 to 15 feet. The soil is best adapted to corn, cotton, and sweet potatoes.

Cotton forms over one-half of the crops, and grows from 1 foot to 4 feet high, 2½ to 3 feet being the best. The seed-cotton product is from 800 to 1,200 pounds, 1,660 to 1,780 pounds making a bale. The staple rates as middling. After fifteen years' cultivation the product is from 700 to 800 pounds, the same as before being required for a bale, and the staple rating the same. As to washing and the remedy, see under first soil. The third soil or land forms one-third of all, and occurs along all the rivers from head to mouth. Cotton is very rarely planted upon it.

M. V. B. EXUM (northwestern part of the county, lands of Cane and Dyer creeks and Middle Fork of Forked Deer river).—About one-fourth of these lands consist of *black buckshot*, rather wet, with a hard-pan subsoil. The second bottoms are richer than the uplands, and, where sandy enough, are preferred; but where sand does not predominate, the uplands or hill lands are preferred. The chief soil is the sandy loam of the second bottoms and some adjacent uplands, which occurs in different directions for 6 miles, and has a red clay subsoil, with more or less sand. The tillage is easy in dry seasons; less so in wet. After heavy rains the soil becomes hard. It is best adapted to cotton, corn, and clover. More than one-half is planted in cotton, which attains a height of from 4 to 5 feet, 3 feet being the best. Wet and warm weather in July and August incline the plant to run to weed, for which topping and taking the dirt from the roots are the remedies. The seed-cotton product per acre on fresh land is from 1,000 to 1,500 pounds, 1,615 pounds making a bale of 475 pounds. The staple is middling to fair. On land worked for ten years the product is from 800 to 1,000 pounds, a little less being needed for a bale. The staple then rates as middling to good middling. The weeds are crab-grass, foxtail, rag-weed, purslane, smart-weed, etc. Very little of the land lies turned out, say one-twentieth, and such land, when taken in again, if not too much in gullies, produces fairly well. The slopes wash seriously, to the injury of the valleys, and some few farms have been ruined. Horizontalizing and hillside ditching have been practiced—the only salvation for hilly lands.

J. D. PEARSON (northeastern part of county).—The soils are: (1) Black clay loam, mixed with sand, second bottom, and upland; (2) alluvial, above overflow or drained; (3) light sandy upland, subject to drought. The first is the chief soil, and forms a fourth of our lands. It extends north from 6 to 20 miles, west 40, south 40, and east 2 miles, and is 10 inches thick. The subsoil is yellow or red, baking hard on exposure, but under cultivation gradually becoming like the soil, though requiring manure to make it fertile. It is underlaid by sand at from 12 to 15 feet. The land is generally easily tilled, and produces corn, cotton, wheat, and some oats. It is best adapted to corn and cotton, one-third being planted in the latter. The plant grows to 2 or 4 feet, 3½ feet being the best. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,485 pounds being required for a bale of 475 pounds. The staple is as good as any. After eight years the product is about 600 pounds, 1,545 pounds then being required for a bale. About one-tenth of the land lies turned out, and where taken in again it does well if not too badly washed. The soil washes seriously in many places, in some localities to the injury of the valleys. Some hillside ditching has been done with success.

The second soil, the *alluvial*, forms one-fourth of the lands. It is best adapted to corn and wheat. Not much is planted in cotton. In dry seasons, on fresh land, it produces 1,200 pounds of seed-cotton to the acre.

The third soil, the *light sandy*, forms half the lands, with the same extent as the first soil. It is 4 inches thick, and rests upon a sandy subsoil, and is best adapted to sweet potatoes, peanuts, and melons. It is difficult to estimate the proportion of cotton planted, as it lies in patches; but when fresh it yields 600 pounds of seed-cotton product to the acre, and after six years' cultivation 400 pounds.

M. P. COLLINS (northeast from Jackson).—The soils vary little. Cotton is always slow in growing, on account of cold nights in late spring and early summer. Much is killed, and the stand is often ruined. Then again the fall frosts often damage the cotton in the boll. The soils are all sandy, and extend for miles on every side. The subsoil is a sandy clay. Sand and gravel lie below at from 5 to 10 feet. The soil is easy to till in dry weather, but difficult in wet. It is late and cold, but well drained. The crops are cotton, corn, wheat, oats, potatoes, and clover. This soil is perhaps best adapted to corn; but nearly one-half of it is planted in cotton, which grows from 3 to 6 feet high, 4 feet being the best. The plant may run to weed on fresh ground in wet weather. To restrain it we use Peruvian guano or stable manure. The seed-cotton product on fresh land is 1,000 pounds per acre, 1,660 pounds making a 475-pound bale. The staple rates as good middling. On land worked ten years the product is 800 pounds per acre, 1,600 pounds then making a bale, the staple being somewhat shorter. Hog-weed and smart-weed are the most common pests. About 1 per cent. of the land lies turned out, and where taken in again, if manured and clovered, produces excellently. The soil washes seriously on slopes, sometimes covering the valleys with sand. Horizontalizing and hillside ditching have been practiced, and with very great success where well done.

D. R. ALLISON (southeast from Jackson, lowland).—The soil cultivated in cotton in this section is *gray gravelly land*, which lies near water-courses and contains gray gravel. This soil, when rained upon after being plowed, looks white. Its timber is beech and elm. One-half of it is planted in cotton, which attains a height of 3 feet. The seed-cotton product on fresh land is from 800 to 1,000 pounds per acre. Of this 1,485 pounds are needed for a 475-pound bale. On land worked for four years the product is the same. The weeds are crab-grass, cocklebur, and smart-weed. The wash from slopes has ruined some of the valley lands. Horizontalizing and hillside ditching have been practiced with good results in some cases.



## CROCKETT.

*Population:* 14,109.—White, 10,493; colored, 3,616.

*Area:* 260 square miles.—Woodland, all.

*Tilled lands:* 65,428 acres.—Area planted in cotton, 17,807 acres; in corn, 25,650 acres; in wheat, 9,883 acres; in oats, 1,501 acres; in tobacco, 35 acres.

*Cotton production:* 9,320 bales; average cotton product per acre, 0.52 bale, 747 pounds seed-cotton, or 249 pounds cotton lint.

Crockett county, claimed by some to be the best body of land for its dimensions in the state, lies lengthwise and symmetrically, in a northwest and southeast direction between two of the forks of the Forked Deer river—the Middle Fork on the northeast and the South Fork on the southwest. Excepting two small segments on the northeastern and southwestern sides, respectively, the one belonging to Gibson and the other to Haywood, the county occupies all the space from fork to fork. Its surface, therefore, is a water-shed, extending longitudinally through the county, with general drainage from a central and higher belt. To the northwest, however, the higher belt is split nearly equally in two by the valley of Pond creek, which rises near the county-seat, Alamo, and runs northwestward out of the county. The surface is further cut by Cypress, Black, and other smaller creeks. In general the county is an upland plateau region, modified by the streams as above indicated. It has many level areas. Sections more or less hilly occur in the western, northwestern, and eastern portions. There is comparatively little of low bottom land; but the second bottoms afford much land, which of late years has been cultivated in cotton with fair success.

The soils out of the low bottoms are very generally fine siliceous or sandy loams based on yellowish or reddish sandy clays, the underlying formation being chiefly the orange sand, and they all produce cotton. The area planted in cotton is from 10 to 15 per cent. of the total area of the county. In considering the soils, Crockett may be divided lengthwise into three nearly equal belts, two lateral or outside, bordering the rivers respectively on the northeast and southwest, and a middle one between. The two lateral belts, supplying the best and strongest lands, are heavily timbered with large white and red oaks, yellow poplar, hickory, ash, elm, maple, beech, gum, walnut, dogwood, papaw, etc. The middle belt has a thinner, lighter soil, is higher and more rolling, and is covered with a dense growth of small black oaks, white "poplar", hickory, etc. In dry, favorable seasons the lateral belts produce the most cotton; in wet seasons, the middle belt. Taking the years together, they all yield about the same average. The staple of cotton raised on the middle belt is finer than that of the others. Cotton is shipped to Memphis by rail at \$2 50 per bale.

## ABSTRACTS FROM REPORTS.

P. M. NEAL (western part of the county, waters of Black creek and South Forked Deer river).—The soils cultivated in cotton are: (1) Dark clay loam of the uplands; (2) a light and fine gray soil, intermixed with brownish gravel and a little fine whitish sand, lowland; in the main above overflow; (3) light brownish soil. The first is the chief soil, and forms one-fifth of this civil district, or, taking the whole county, one-twelfth of the lands. It occurs in spots mostly on the highland belts adjacent to the river valleys, and is from 10 to 12 inches thick. The subsoil is a light and tough yellow clay, baking hard when exposed, and quite impervious to water. It contains more or less hard, yellowish gravel, and is underlaid by sand at from 5 to 6 feet. The land is tilled with difficulty in wet or very dry seasons, but with ease if the ground is in good condition. It is warm when well drained, producing chiefly corn, cotton, and wheat, but is best adapted to the first two. About one-fifth is planted in cotton, which grows from 3½ to 5 feet high. The plant inclines to run to weed in wet weather, and the only remedy known to me is to drain and cultivate lightly. The seed-cotton product on fresh land is 800 pounds per acre, 1,780 pounds making a bale of 475 pounds. After fifteen or twenty years' cultivation the product is about 600 pounds if the land is not washed and not too far exhausted. Of this 1,545 pounds make a bale. The staple of old land is considered better than that of the fresh, and the best cotton is made on such land. Cocklebur, crab-grass, and foxtail are the pests. Not more than one-thirtieth of this land lies turned out. Such land taken in again produces well if the soil is not washed away, especially if broken up the previous fall. Soil washes readily on slopes, causing damage in places. Some valleys are injured, but not seriously. Horizontalizing and hillside ditching have been practiced, but to no great extent. Where done well, the results are very good.

T. J. WOOD (county generally).—Our soils are: (1) Black poplar, second bottom, and upland; (2) clay soil, worn out or poor lands, and plenty of it; (3) buckshot, or white crawfishy, low for cultivation and poor. The first is the chief soil, forming one-third or more of the lands. It is from 3 to 5 inches thick, is difficult to till in wet weather, but easy in dry. The crops are corn, cotton, wheat, and oats, the soil being best adapted to corn. About one-fourth is planted in cotton, which grows from 3 to 3½ feet high, 3 feet being the best. The plant tends to run to weed on fresh ground and in very wet weather, and the remedy is topping. The seed-cotton product on fresh land is 800 pounds, 1,600 pounds making a bale. The staple rates as middling. After five years' cultivation the product is from 400 to 500 pounds, and the staple is shorter and a shade under middling. Crab-grass is troublesome. Very little of this land lies turned out, and when taken in again does well if seeded to clover or sown in pease. The soil washes seriously on slopes if not attended to, but the valleys are rather benefited. Horizontalizing and hillside ditching have been practiced with very good results.

E. J. READ, SR. (lowland of Black creek and uplands generally).—The soils cultivated in cotton are: (1) Black poplar, creek, valley, and upland; (2) second river bottom; (3) thin red clay. The first is the chief soil, forming one-half of the lands, and extending off from 10 to 20 miles. This soil is 8 inches thick. The subsoil is tough reddish clay, baking hard, but gradually becoming soil by cultivation, which contains some gravel, and is underlaid by sand at from 10 to 20 feet. The land is easily tilled in dry weather, but is difficult in wet, and about equally adapted to the crops produced. About half the crops is cotton, which averages 2½ feet in height, 3 feet being most productive. If necessary, topping in August restrains the plant. The seed-cotton product on fresh land is 1,200 pounds, 1,900 pounds making a bale of 475 pounds. Staple rates as middling. On land worked for six years the product is 800 pounds, 1,780 pounds then making a bale, and the staple is better. Crab-grass is the pest. About one-tenth of this land lies turned out, and when taken in again produces well for several years. The soil washes readily on slopes, but the damage is not serious, the valleys being greatly improved thereby.

The second river bottom forms about one-third of the lands. It is a clay loam, 8 inches thick, with a subsoil like that of the first soil. About two-thirds of this land is planted in cotton. The seed-cotton product on fresh land is from 1,200 to 1,500 pounds per acre. About one-twentieth lies turned out. In other respects it is like first soil.

The thin red clay forms one-fifteenth of the lands, and is 2 or 3 inches thick. The subsoil is a red clay, but is not fertile. The land is early, warm, well drained, and best adapted to cotton, which forms two-thirds of the crops. The seed-cotton product is 800 pounds per acre, the staple rating middling. On land worked four years the yield is 400 pounds per acre, the staple being better

GIBSON.

*Population*: 32,685.—White, 23,540; colored, 9,145.

*Area*: 550 square miles.—Woodland, all.

*Tilled lands*: 146,163 acres.—Area planted in cotton, 36,820 acres; in corn, 57,838 acres; in wheat, 26,016 acres; in oats, 3,378 acres; in tobacco, 56 acres.

*Cotton production*: 19,272 bales; average cotton product per acre, 0.52 bale, 747 pounds seed-cotton, or 249 pounds cotton lint.

Gibson county lies chiefly between the South Fork of the Obion river on the northeast and the Middle Fork of the Forked Deer on the southwest. To this must be added a small segment cut off by a bend in the latter river, and lying on the Crockett county side. The longest line that could be drawn in Gibson would lie in a northwesterly and southeasterly direction about midway between the rivers mentioned, and would connect the northwestern and southeastern corners of the county. Rutherford Fork of the Obion river traverses the northeastern part of the county. Little North Fork of the Forked Deer is an important stream. Besides these, there are many creeks draining all parts of the surface. Gibson county is a part of the great plateau region of West Tennessee, and is the most northerly of four counties constituting a central group in West Tennessee, the others being Crockett, Haywood, and Madison. The surface of the county is generally level, though cut up or made more or less rolling by the valleys of the streams. South and east from Trenton, the county-seat, the county is more hilly than in other sections. The prevailing soil is uplands, a sandy, fertile, and mellow clay loam with sandy clay subsoil, the latter generally resting upon strata of the orange sand. The parts of the bottoms of the rivers and larger streams above overflow afford a comparatively small proportion of the lands. Some of these are dark and rich, others (and no inconsiderable part of the whole) are light colored and crawfishy. The growth of the uplands is "poplar", white, red, and black-jack oaks, sweet and black gum, ash, elm, hickory, walnut, beech, chestnut, dogwood, papaw, hazel, etc.; that of the bottoms or second bottoms, oak, hickory, beech, sweet gum, ash, and some papaw. The lands are well suited to the growth of cotton, and this is the principal crop. But for the shortness of the season the yield, acre for acre, would be equal to that of some of the best lands much farther south. With the exception of the northeastern corner of the county, the relative proportion of the area planted in cotton is from 10 to 15 per cent. of the total area. In the part excepted it is from 5 to 10 per cent. Cotton is shipped by rail to Memphis at from \$2 to \$2 25, and to New Orleans at \$3 25 per bale.

ABSTRACTS FROM REPORTS.

L. P. McMURRY AND J. W. HAYS (southwestern part of county, Big Creek and Forked Deer River lands).—Creeks flowing into the Forked Deer have low, wet bottoms, subject to overflow, and mostly unfit for cultivation. Uplands vary greatly from clay loam to "buckshot". Rains often prevent early planting, and early frosts often injure the plant before maturing, especially on fresh land and lowlands. The soils cultivated in cotton are: (1) Clay loam on level and rolling uplands; (2) dark and gray loam soil of the Forked Deer river and its tributaries above overflow; (3) "buckshot" upland, containing small ore-like gravel—a cold land. The clay loam is the chief soil, forming about 85 per cent. of our lands, and occurring throughout the county. It is yellow clay loam from 8 to 12 inches thick. The subsoil is a tough yellow clay, with more or less sand, baking when exposed, and by culture becoming like the soil; leachy on the slopes, impervious when undisturbed, and underlaid by sand at from 15 to 25 feet. Tillage of the land rather difficult when wet, but generally not troublesome. Early when well drained. The crops are corn, wheat, oats, cotton, red clover, timothy, and herd's-grass. The soil is well suited to all. One-third of the tillable land is planted in cotton. Deep plowing and much vegetable mold cause the plant to run to weed; shallow plowing, with stable manure and superphosphates, restrain it. The seed-cotton product on fresh land is 1,000 pounds per acre, 1,720 pounds making a 475-pound bale. Staple rates as middling. On land worked ten years the product in ordinary seasons is from 800 to 900 pounds, 1,600 pounds making a bale, but the staple is not so long as on fresh land. The weeds are crab-grass, foxtail, smart-weed, and cocklebur. About 2 per cent. of the land lies turned out. A little has been reclaimed, but does not produce well. Soil washes seriously on hilly land, and sometimes ruins the lower lands. Horizontalizing and hillside ditching have been practiced with good results.

The dark and gray loam of the lowlands, forming about 5 per cent. of the lands in this region, occurs along the river and larger creeks throughout the county. The subsoil is a tough bluish clay, baking hard, but by cultivation becoming like the soil. It is impervious when undisturbed, and is underlaid by sand at various depths. Tillage is not difficult unless when wet. The soil is generally late, and is best adapted to corn and sorghum; but much of it is planted in cotton, the latter growing to 4 and 7 feet, a medium most productive. Wet weather inclines the plant to go to weed. The seed-cotton product is about 1,200 pounds per acre, 1,720 pounds making a bale of 475 pounds. Staple is middling. After ten years' cultivation the product ranges from 800 to 1,000 pounds, with the staple about the same. The weeds are smart-weed, cocklebur, crab-grass, and foxtail. Little of the land has been turned out. Some injury is caused by washes from upland.

J. M. SENTER AND Z. BRYANT, SR. (county generally).—The soils of the county are: (1) Dark-brown clay loam; (2) Dark sandy loam in small proportion. The first is the prevailing soil of the county. The subsoil is a yellow clay, underlaid by sand at 15 feet. The crops are cotton, corn, clover, wheat, oats, and grasses. The soil is best adapted to the first three, but one-half of it is planted in cotton, which attains a height of from 3 to 6 feet. Topping is practiced to restrain the plant from going to weed on fresh land. The seed-cotton product on fresh land is 1,000 pounds per acre, 1,780 pounds making a bale of 475 pounds. After four years' cultivation the product is from 1,000 to 1,200 pounds. The staple is middling in both cases. None of the land lies turned out. The slopes wash seriously, and the valleys are also injured thereby. Hillside ditching has been practiced with good results.

The second soil is met with over the county. The subsoil is a reddish-yellow clay. Cotton grows from 2 to 3 feet, 2½ feet being the best. The seed-cotton product on fresh land is from 600 to 800 pounds, 1,780 pounds making a 475-pound bale. On land worked for four years the product is 700 pounds. The staple is middling in both cases. Little of the land lies turned out, and when taken in again produces well after pease or clover. The washing of slopes, etc., as under the first soil.

WEAKLEY.

*Population*: 24,538.—White, 20,125; colored, 4,413.

*Area*: 620 square miles.—Woodland, all.

*Tilled lands*: 129,075 acres.—Area planted in cotton, 15,406 acres; in corn, 50,001 acres; in wheat, 25,479 acres; in tobacco, 4,770 acres; in oats, 1,795 acres.

*Cotton production*: 7,576 bales; average cotton product per acre, 0.49 bale, 702 pounds seed-cotton, or, 234 pounds cotton lint.



Weakley is one of the northern tier of counties adjoining the state of Kentucky, and is well supplied with water-courses, which flow very generally in a westerly direction. Two of the large forks of the Obion river, the North Fork in the northern part of the county and the Middle Fork in the southern, pass entirely through its area. On the southwest the South Fork of the Obion separates the county from Crockett. The creeks tributary to these are very numerous, and some of them are large. The county is a typical part of the plateau slope of West Tennessee. Its surface is generally level, but more or less broken areas occur, as around Dresden, the county-seat. The northeastern part inclines to be hilly. The formation underlying the subsoil is chiefly the orange-sand drift; but occasionally, in banks along streams outcropping from beneath this, the dark laminated sands and clays of a lower formation are seen. The prevailing soil, that of uplands and sloping lands, is generally a brown, siliceous loam, more or less clayey, fertile, and suited to corn, wheat, cotton, tobacco, oats, potatoes, grasses, and indeed any crop of the latitude. The growth is black and other oaks, poplar, beech, hickory, black and sweet gum, black walnut, dogwood, and hazel-nut. In parts of the county, as east of Dresden, are areas denominated "barrens", which are of different kinds, the "hickory, dogwood, and black gum barrens" affording good land, the "post-oak barrens", with land of second quality, and the "black-jack barrens", with poor land. The streams of the county are, for the most part, sluggish, and their bottoms low, more or less subject to overflow, and comparatively of little agricultural value. The parts above overflow, however, supply good land. On the map showing percentage areas of cotton it is seen that in about two-thirds of the county, including the southern and southwestern portions, the relative per cent. of acreage in cotton to total acreage for the census year was from 5 to 10; in most of the remainder from 1 to 5 per cent. In the extreme northeastern part it was 0.1 to 1. Cotton is shipped by rail to Nashville at from \$1 to \$1 25, and to New Orleans at \$3 25 per bale.

#### ABSTRACTS FROM REPORTS.

J. C. LIPSCOMB, G. PATTERSON, AND E. D. TANSILL (southwestern part of the county, Mud creek and Obion River lands).—The uplands vary. Some are white-oak highlands, with hickory and poplar, and the most productive; some have a red oak growth; but others are post-oak glady lands. The uplands are preferred for cotton on account of shortness of season; but with a late fall, as in 1879, bottom lands make the best crops. The soils put in cotton are: (1) The white-oak and hickory highlands and the post-oak ridge; (2) branch bottom and second bottom of the smaller rivers. The first is the chief soil, and forms about one-third of the area, or half the lands in cultivation. The soil is a clay loam (the white oak part brown, the glady part whitish) from 3 to 8 inches thick. The subsoil is a yellow clay, washing easily, but rather impervious. Land is easily cultivated in dry seasons, but not in wet, and is early when well drained. All our crops do well on it. One-third of the crops in this section is cotton, which averages about 3 feet in height. The seed-cotton product on fresh land is about 1,000 pounds, from 1,660 to 1,720 pounds making a bale of 475 pounds; on land five years in cultivation the product is from 800 to 1,000 pounds. The staple is much the same in both cases. Crab-grass, with some foxtail, is troublesome. About 8 or 10 per cent. of the land lies turned out. Such land when taken in again does poorly unless manured. Hillsides are rarely reclaimed. The slopes wash seriously, but the valleys are not much injured thereby. Little if any effort is made to check the damage.

A. M. SMYTH (southern part of county, Spring Creek and Obion River lands).—As a general thing none but the first quality of lands are cultivated in cotton. The soils are: (1) Brown sandy of table-land and second bottoms; (2) gray or mulatto, undulating; (3) poor and broken. The first is the chief soil, and forms about one-third of our lands. Thickness, 6 inches. Subsoil is light, loamy, and gray. Tillage is easy in dry seasons, but less so in wet. Land is best adapted to cereals and grasses. One-fourth is planted in cotton, which grows to 3 and 4 feet in height. Plants are restrained by barring off with turning-plow and by topping. The cotton-seed product on fresh land is from 1,000 to 1,200 pounds per acre, from 1,425 to 1,500 pounds making a 475-pound bale; on land worked for ten years the product is from 600 to 1,000 pounds, the staple on fresh land being the best. Crab-grass is the troublesome weed. But little land in my section is turned out, and that generally is damaged by the tramping of stock. Slopes wash seriously, but the valleys are not much injured thereby. Ditching has been done with success.

T. D. MARTIN, G. W. ISBELL, AND S. C. CRAVENS (northwest from Dresden).—The soils cultivated in cotton are: (1) Upland; (2) bottom. The chief soil is the upland, forming four-fifths of the lands. It is a clay loam, mahogany and black alternating, and 5 inches thick. The subsoil is a tough, yellow clay, impervious when undisturbed. The land is best adapted to corn. Ten per cent. of cotton is planted. Plant is restrained by topping. The seed-cotton product on fresh land is 1,200 pounds per acre, 1,660 pounds making a 475-pound bale; on land in cultivation for ten years from 800 to 900 pounds, from 1,545 to 1,600 pounds making a bale. Staple on fresh land is a little longer. Crab-grass is the most troublesome.

The bottom land is about one-fifth of the lands. It is a black loam 12 inches thick. The subsoil is a tough whitish clay, baking hard on exposure, but becoming like the surface soil. Tillage is not usually troublesome. The soil is early when well drained. Cotton grows from 4 to 6 feet high. Topping is resorted to when necessary. The seed-cotton product is from 1,200 to 1,500 pounds, according to season, about 1,660 pounds making a 475-pound bale.

HENRY.

(See "Summit region of the water-shed".)

CARROLL.

(See "Summit region of the water-shed".)

OBION.

(See "The Bluff region".)

TIPTON.

(See "The Bluff region".)

SHELBY.

(See "The Bluff region".)

HENDERSON.

(See "Summit region of the water-shed".)

McNAIRY.

(See "Summit region of the water-shed".)

THE SUMMIT REGION OF THE WATER-SHED.

In this region are included the middle part of Henry county, the eastern part of Carroll, nearly all of Henderson and McNairy, and the western margins of Hardin,\* Decatur,\* and Benton.\* The southeastern corners, respectively, of Hardeman\* and Madison\* project into the area of this subdivision. The two latter counties have been described under "Brown-loam table-lands". Further, the northwestern corner of Henderson is cut off to the table-lands, and the northeastern part of Henry to the western valley of the Tennessee river.

HENRY.

*Population:* 22,142.—White, 15,488; colored, 6,654.

*Area:* 550 square miles.—Woodland, all.

*Tilled lands:* 133,392 acres.—Area planted in cotton, 13,186 acres; in corn, 51,852 acres; in wheat, 20,853 acres; in oats, 3,171 acres; in tobacco, 2,726 acres.

*Cotton production:* 5,516 bales; average cotton product per acre, 0.42 bale, 597 pounds seed-cotton, or 199 pounds cotton lint.

Henry is the most northeasterly county of West Tennessee. Its northeastern corner reaches to the Tennessee river, and its northern boundary coincides with the Kentucky line. It is near the northern border of the cotton-growing region. The northeastern half of the county had on an average in the census year less than 1 per cent. of its area planted in cotton, the southwestern and the southeastern corners from 5 to 10 per cent., and the remainder of the county from 1 to 5 per cent. The summit-line dividing the waters of the Mississippi from those of the Tennessee runs in a direction a little north of east through the center of the county. Along this line or "divide" are strips of ridgy land with sandy soil, easily washed, but producing fair crops of corn, wheat, and cotton. To the west of the line the county slopes at first gently away, then becomes level, supplying large sections of fine farming lands, the whole well watered by a great spray of branches and creeks, the headwaters of the middle and north forks of the Obion river. To the east of the summit-line the general slope to the Big Sandy and Tennessee rivers is greater, and the country more broken; nevertheless, extensive areas of level and nearly level productive lands occur. The eastern slope is broken chiefly by West Sandy river and its tributaries.

The prevailing soil of this county is a brown siliceous or sandy loam, found on uplands and slopes and in the valleys of the smaller streams, upon which corn, wheat, cotton, oats, and tobacco grow well and are the leading crops. The subsoils are yellowish or reddish clays, more or less sandy. The timber is white and black oaks, poplar, hickory, and dogwood; also, interspersed with these, are elm, walnut, ash, mulberry, red-bud, etc. On the higher lands, with a thinner soil, are red, post, and sometimes black-jack oaks, chestnut, etc. There is no great extent of tillable bottom land along the larger streams. Second bottoms are often desirable tracts. The growth of the bottoms consists of beech, white and water oaks, sweet gum, poplar, maple, and cypress; that of the second bottoms is much the same, excepting cypress.

The underlying formations are various. In the middle and western portions are great strata of laminated sands and clays, and in the extreme eastern and northeastern portions are beds of limestone and cherty rocks. All these, however, are generally concealed by the beds of the orange sand, the latter giving origin to the sandy soils.

Cotton is shipped by rail to Memphis or Saint Louis at from \$2 to \$3 per bale.

ABSTRACTS FROM REPORTS.

S. C. DOBBINS (southern and southwestern part of the county).—Rolling and level table-land. The black sandy soil, which forms one-fourth of the lands, is preferred for cotton, and extends 12 miles south of Paris, where most of the cotton of the county is raised. Thickness, 6 inches. The subsoil is generally clay, underlaid by sand at from 10 to 15 feet. Tillage is easy in all seasons. One-tenth of the crops consists of cotton. To restrain the plant and favor bolling some farmers top, but I doubt the advantage. The seed-cotton product on fresh land is 1,000 pounds per acre, 1,545 pounds making a 475-pound bale; on land worked a number of years the product is from 600 to 800 pounds, the staple middling in both cases. The weeds are rag-weed and cocklebur. I cannot say how much land is turned out, but when taken in again, if sown in pease, it would be improved. Slopes wash seriously, and valleys are much injured.

J. F. CAVITT (western part of the county, waters of the forks of the Obion river).—The black sandy loam of hazel-nut valleys and ridges in the northwestern part of the county is the chief soil, making one-tenth of the lands, in bodies of from 50 to 1,000 acres or more, and from 5 to 8 inches thick. The subsoil is brownish-red, leachy, and is considered injurious when mixed with the soil. Tillage is easy in dry seasons, but is not very troublesome in wet. Land is early and warm when well drained, and is best adapted to corn, tobacco, wheat, and cotton, in the order named. About one-tenth of crops is cotton, which reaches 3½ feet. The plant is restrained, when necessary, by topping from the 1st to the 10th of August. The seed-cotton product on fresh land is from 700 to 1,200 pounds per acre, 1,660 pounds making a 475-pound bale; after ten years' cultivation, if the land is cared for, from 600 to 800 pounds, from 1,660 to 1,780 pounds making a bale. Staple of fresh land is middling upland; that of old land hardly so long. Only grasses are troublesome. Much of the land is turned out, and is not improved thereby. The slopes sometimes wash seriously; some valleys are thus injured, others not. Some horizontalizing and hillside ditching are done, with very good results.

The blackish clay or black table-land of the southwest, forming one-fifteenth of the lands, is found in large tracts, and is from 5 to 8 inches thick. Subsoil is brownish-red sandy clay. Tillage is rather difficult in wet seasons, and the land is early. Cotton forms one-fifteenth of the crops, which grows to a height of 3½ feet. Seed-cotton product on fresh lands is from 800 to 1,000 pounds per acre, 1,660 pounds making a 475-pound bale. Staple is middling upland. On land ten years old, if preserved, the product is from 700 to 1,000 pounds per acre. Grasses only are troublesome. Washing of soil, the damage and remedy, are as under first soil.

The clay or ridge land of the southwest, forming one-tenth of the lands, occurs in large tracts, with red and post oak growth; thickness, from 2 to 3 inches. Subsoil, pale yellow clay, underlaid by sand at some depth. Land is late and cold when well drained, and is best for corn and grasses. One-fifth of the crops is cotton, which grows to 2½ feet. The seed-cotton product on fresh land is from 400 to 700 pounds, requiring from 1,660 to 1,780 pounds for a 475-pound bale. Staple rates middling upland. On land worked for ten years, if preserved, the product is 300 pounds, and it then requires from 1,780 to 1,900 pounds for a bale. The staple is shorter. Not much washing occurs on slopes, but the valleys are injured thereby. Horizontalizing and hillside ditching have been practiced with moderate success.

A. ROBINS (south of east from Paris, land of Gin branch and Big Sandy river).—The soils are much the same, and are: (1) Black sandy, level; (2) gray sandy, rolling; (3) pipe-clay of creek bottoms. The *black sandy* is the chief soil, forming a third of the lands, and extends 2 miles northeast and 6 miles southwest. It is a sandy loam from 8 to 10 inches deep. The subsoil is a yellow sandy clay, productive when exposed for a time, and underlaid by sand at from 10 to 20 feet. The chief crops are corn, cotton, and tobacco, one-third being cotton, which grows from 3 to 3½ feet. Seed-cotton product on fresh land is from 1,000 to 1,200 pounds per acre, 1,425 pounds making a bale. The staple rates well. After thirty years' cultivation the product is from 500 to 800 pounds per acre, the staple and amount required for a bale being as before. The weeds are cocklebur and careless-weed. None of the land lies turned out. Slopes wash seriously if neglected, and horizontalizing and hillside ditching have been tried with considerable success.

D. L. WILLETT (southeastern part of the county, in the angle between the Big and West Sandy rivers).—The crops of the *upland sandy loam* are cotton, corn, tobacco, wheat, oats, pease, peanuts, potatoes, and sorghum; but the lands are best suited to cotton and peanuts. Post-oak glades make fair cotton. Cotton forms three-fourths of the entire crop, and grows from 3 to 4 feet high. Topping about the middle of August restrains the plant from growing rank on fresh ground or in wet seasons. The seed-cotton product on fresh land is from 1,000 to 1,500 pounds, from 1,660 to 1,900 pounds making a bale of 475 pounds. Staple rates good ordinary. The product on old land falls off with loss of soil, and staple loses length and fineness. Weeds are crab-grass, cocklebur, foxtail, and purslane.

The *black sandy bottom* forms about a sixth of the lands. Very little of it is planted in cotton. The plant grows from 2 to 5 feet in height; a medium is most productive. Seed-cotton product on fresh land is from 500 to 1,200 pounds per acre, but after five years' cultivation the crop is better. One-fifteenth lies turned out.

The *rolling second bottom* forms about a tenth of the lands. One-fifth is planted in cotton, which grows from 2 to 4 feet high, but is best at 3 feet. One-tenth lies turned out. Slopes wash badly, valleys being injured thereby. Horizontalizing and hillside ditching have been tried with only moderate success.

J. R. WILLIAMS, B. D. BOWDEN, W. P. SMALLWOOD, AND DR. W. S. FRYER (county generally).—The soils cultivated in cotton are: (1) Black sandy loam on flat and productive highlands, also in bottoms of the Obion and Sandy rivers; (2) gray sandy, moderately light soil, ridgy or hilly; (3) light poor soil, upland and hilly; (4) whitish clay of flatlands. The *black sandy loam* forms about a fourth of our lands, embracing much of the southern portion of the county, and is from 6 to 15 inches thick. Subsoil is red clay. This land is best adapted to corn, wheat, rye, and sorghum. About one-fourth of the crops is cotton. The plant grows from 2 to 4 feet, the latter the best, which can be restrained, if necessary, by topping in August. Seed-cotton product on fresh land per acre is from 800 to 1,500 pounds, about 1,900 pounds making a 475-pound bale. On land worked five years the product is from 400 to 800 pounds. The weeds are crab-grass, cocklebur, and hog-weed. About one-third of this land lies turned out, and if taken in again would do fairly if not gullied. Slopes wash seriously, but valleys are not much injured thereby. Some horizontalizing and hillside ditching have been done, though not generally with good results.

The *gray sandy* forms a fourth or more of our lands, extending pretty well over the county, with a thickness of from 4 to 6 inches. The subsoil is a reddish clay. Land is early and warm, and is best adapted to cotton. The largest proportion of crops is cotton. Plant grows from 1½ to 3 feet, the latter the best. Seed-cotton product on fresh land is from 500 to 1,000 pounds per acre, 1,400 pounds being required for a 475-pound bale. Staple is second class. On land cultivated five years the product is from 400 to 700 pounds, and the same is required for a bale. Staple is a shade better. The weeds are as on first soil. One-half of this land lies turned out, but where taken in again it does fairly if not washed. Washing on slopes, etc., as under first soil.

The *light poor soil* occurs in small proportion over the county, and has a growth of oaks of different kinds, post, black, red, and black-jack; thickness from 2 to 4 inches, and is best adapted to grass. Very little is planted in cotton. Plants grow from 1 foot to 2 feet, the latter being the best. Seed-cotton product on fresh land is from 200 to 400 pounds per acre, 2,010 pounds making a bale of 475 pounds. Staple is only common. Crab-grass is troublesome.

The *whitish clay of flatlands* forms about a tenth of cultivated lands. Growth, post and white oaks, shell-bark hickory, etc. The subsoil is whitish clay, becoming soil on exposure, quite impervious, and underlaid by sand at from 8 to 15 feet. Land is late; generally too wet, and is best adapted to grass and corn. About one-fourth is planted in cotton, which grows to 3 feet. The seed-cotton product on fresh land is from 800 to 1,000 pounds per acre, 1,800 pounds being required for a 475-pound bale. Staple, middling upland. On land worked ten years and cared for the product is from 600 to 800 pounds. Crab-grass only is troublesome. Very little land is turned out, and is level and does not wash.

A *sandy loam of hazel hollows and branch bottoms*, much less in extent than the others, occurs in tracts of from 100 to 500 acres. Growth, black oak, hickory, and black-jack. The soil is fine sandy loam, 8 inches thick. The subsoil is sandy, leachy, and underlaid by sand at from 3 to 10 feet. Tobacco grows finely upon it. One-fourth of the crops is cotton, which grows to 3½ feet, the best height. Seed-cotton product per acre on fresh land is from 1,200 to 1,500 pounds, 2,140 pounds making a bale of 475 pounds. Staple rates middling upland. After ten years' cultivation the product is reduced to 800 or 1,000 pounds per acre. Crab-grass is troublesome. Washing of land is as under first soil.

## CARROLL.

*Population*: 22,103.—White, 16,524; colored, 5,579.

*Area*: 550 square miles.—Woodland, all.

*Tilled lands*: 120,231 acres.—Area planted in cotton, 24,711 acres; in corn, 46,076 acres; in wheat, 17,354 acres; in oats, 3,413 acres; in tobacco, 100 acres.

*Cotton production*: 10,505 bales; average cotton product per acre, 0.43 bale, 606 pounds seed-cotton, or 202 pounds cotton lint.

The greater part of Carroll (more than two-thirds) is drained by the head streams of two forks of the Obion river, South Fork and Rutherford's Fork. The remainder of the county, the eastern end, is drained by the Big Sandy river, which traverses the county, passing out at the northeastern corner. To the west of the Big Sandy, and crowding upon its valley, is the belt of highlands dividing the waters of the Mississippi from those of the Tennessee. Regarding the county from this "divide", we have to the west a plateau slope embracing the middle and western parts, and to the east a valley (though no very deep one) constitutes the remaining part. The middle part is much broken. There are two small areas, corners of the county, not included above: the extreme southwestern, crossed and drained by the Middle Fork of the Forked Deer river, and the extreme southeastern, lying on the divide between the Big Sandy and the Tennessee.

The northern and western portions of the county present many level areas; but the middle, southern, and eastern portions are often broken, and the latter are sometimes hilly. The prevailing soils of the county are brown and grayish loams, more or less sandy, found on uplands and in the valleys of branches and small streams, with reddish and

yellow and reddish clayey subsoil, the whole underlaid usually by sand, but in some localities within a belt running north and south through the middle of the county by laminated clay (soap-stone). The growth includes hickory, poplar, post, red, and black oaks, and gum, and, locally, ash, walnut, cherry, and chestnut. The principal crops are corn, cotton, wheat, oats, pease, sorghum, tobacco, sweet and Irish potatoes, clover, and grasses. The lands appear to be best adapted to corn and cotton. On the map of relative acreage in cotton it is seen that the county had, with the exception of two portions, from 5 to 10 per cent. of its area in cotton. The exceptions are: the southwestern corner, in which the percentage was greater, from 10 to 15, and a peninsula-like portion running down from Henry, nearly through the middle of the county, in which it was less, from 1 to 5 per cent. Cotton is shipped by rail at \$2 75 to Memphis and \$3 25 to New Orleans and Mobile.

ABSTRACTS FROM REPORTS.

A. R. CARNES AND T. N. LANKFORD (northern and northwestern part of the county, Obion uplands).—Bottoms do not produce cotton in this region. The soil cultivated in cotton is the light sandy loam of the uplands, forming about 40 per cent. of our lands, and extending off 20 miles in every direction. About one-fourth is planted in cotton, which grows to a height of 3½ feet, the best for a good yield. Warm, wet, and cloudy Augusts incline plants to run to weed, for which no remedy is known here. Seed-cotton product per acre on fresh land is from 600 to 1,000 pounds, 1,545 pounds making a bale. After fifteen years' cultivation the product is 600 pounds, but varies greatly, according to the care taken. The staple is best on old land, seed lighter, and lint longer. The weeds are careless-weed, cocklebur, crab-grass, and foxtail. One-tenth of the land is turned out; if taken in again would produce well if not gullied. Slopes wash seriously; some valleys are injured thereby. Hillside ditching has been done with success.

E. T. BOHANNON AND B. T. HILSMAN (western part of the county, lands of Lick and Reedy creeks and Obion river).—Cotton is cultivated on good upland and on black sandy bottom land. The chief soil is good upland, forming one-half of our lands, and extends many miles north, west, and south. The country to the east is broken and varied to the Tennessee river. The soil is blackish, and is from 6 to 12 inches thick. Subsoil, a red and yellow clay, underlaid by sand at from 15 to 20 feet. Tillage is easy in dry, but difficult in wet seasons. The chief crops are corn, wheat, and cotton. One-fourth of the crops is cotton, which grows from 2½ to 5 feet high, but is best at 4 feet. Seed-cotton yield per acre on fresh land is from 1,000 to 1,500 pounds, 1,545 pounds making a bale of 475 pounds, the staple rating as good middling. On land worked 10 years the product is from 700 to 1,000 pounds; amount for bale and staple as before. Weeds are crab-grass and cocklebur. Five per cent. of the land lies turned out, and if not washed would produce well again for a few years. Slopes wash readily, and valleys are more or less injured.

J. F. SLOAN (western part of the county, Obion lands).—The black sandy soil of the "hickory barrens" is our best cotton soil, and will make fair cotton every year, wet or dry. Yellow sandy soil fires in dry seasons, causing squares to shed. Dry branch bottoms and old bottoms manured will bring good cotton, maturing early and opening well. On rich bottoms cotton grows too tall and shades itself, causing the bolls to rot and not to open. On gravel or clay land it is difficult to get a stand. The chief crop is cotton, the soil being best adapted to this and corn. One-half or more of the crops is cotton. The plant grows to 4 feet, which can be restrained, if need be, by close cultivation or throwing dirt from the plant to destroy fibrous roots. Seed-cotton product per acre on fresh lands is from 1,000 to 1,200 pounds, 1,425 pounds being required for a 475-pound bale. The weeds are crab-grass, cocklebur, and smart-weed. Very little of the land lies turned out. On such land, when taken in again, crops are generally light. Slopes wash seriously if neglected; valleys are also injured. In some places hillside ditching has been done with very good results.

J. H. JORDAN (northeastern part of the county, lands of Hollow-rock creek and the Big Sandy river).—The chief soil is the sandy clay loam of the flat uplands. Its crops are corn, wheat, oats, and cotton, but the land is best adapted to corn. One-third of the crops is cotton. The plant grows to 4 feet, 3½ feet being the best. Topping is used to restrain plant, if need be. Seed-cotton product per acre on fresh land is 1,000 pounds, 1,545 pounds making a 475-pound bale, the staple rating as good middling. The weed is cocklebur. No land lies turned out. Sandy slopes wash readily, but the damage is not great. Horizontalizing and hillside ditching have been done with good results.

Of the *black hilly uplands* there are 1,000 acres in this region. The soil is 8 inches thick, and is best adapted to corn. One-third of the crops is cotton. Seed-cotton product on fresh land is 1,000 pounds per acre, 1,545 pounds making a bale; staple rates as good middling. None of the land lies turned out.

The *black bottom soil* forms a third or less of our lands, and is best adapted to corn. One-third of the crops is cotton. Plant grows to 4 feet, most productive at 3 feet; restrained, when need be, in wet weather by topping. Seed-cotton product is 1,000 pounds per acre, 1,545 pounds making a bale; staple rates as good middling. Cocklebur is the troublesome weed. No land lies turned out.

WILLIAM JOHNSON (southeastern part of the county, Roane's Creek and Big Sandy River lands).—The lands cultivated in cotton are: (1) Coarse black sandy, lying up; (2) fine red sandy; (3) pale yellow clay land. The *coarse black sandy* forms one-tenth of our lands, and occurs in tracts of 10 and 20 acres, alternating with the red sandy for miles. It is a sandy loam 8 inches thick. The subsoil is yellowish, getting white on going down, and underlaid by sand at about 6 feet. Tillage is easy in dry seasons, but difficult in wet. The land is early, warm, and well drained, and is best adapted to cotton, corn, and grass. One-third of the crops is cotton, which usually grows to 2½ feet, but is best at 3½ feet. Warm, wet weather inclines the plant to run to weed, which is restrained only by dry weather and ceasing to plow. The seed-cotton product on fresh land is from 800 to 1,000 pounds per acre, 1,720 pounds being required for a 475-pound bale. On land worked ten years the product is from 500 to 800 pounds, and 1,660 pounds are then required for a bale; staple is better than on fresh land. The weeds are cocklebur and careless-weed. One-fifth of the land lies turned out; if taken in again and not washed it would produce well. Slopes frequently wash seriously, and the valleys are more or less injured. Horizontalizing and hillside ditching have been done with good results.

The *red sandy soil* forms also a tenth of the lands; thickness, 5 inches. Subsoil yellow for 6 feet down, then whiter, and underlaid by white sand. One-third of the crops is cotton, the latter usually growing 3 feet high. Seed-cotton product on fresh land is from 700 to 900 pounds, and 1,720 pounds are needed for a bale. On land worked eight years the product is from 400 to 700 pounds, 1,660 pounds making a bale; staple better than on fresh land. Weeds as under first soil. One-tenth of this land is turned out; if taken in again and not gullied would produce very well for a short time. Washing on slopes damages as under first soil.

The *pale yellow clay soil* forms about one-third of the cotton lands, and occurs in bodies of from 20 to 40 acres for long distances. Growth, red and post oaks and some dogwood. Thickness, 3 inches. Subsoil deeper yellow than the soil, and underlaid by gravel at 2 or 3 feet. Tillage is difficult in wet weather; less so in dry. The soil is late, cold, and ill-drained, and is best adapted to corn and grass. One-third of the crops is cotton, the latter growing usually to 18 inches; best at 3 feet. Seed-cotton product on fresh land is from 600 to 800 pounds, 1,690 pounds being needed for a bale; after ten years' cultivation the product is from 400 to 500 pounds. One-sixth of this land is turned out; if not washed, and taken in again, it would produce well for a time.

## HENDERSON.

*Population*: 17,430.—White, 14,414; colored, 3,016.

*Area*: 580 square miles.—Woodland, all.

*Tilled lands*: 93,241 acres.—Area planted in cotton, 22,344 acres; in corn, 37,734 acres; in wheat, 9,791 acres; in oats, 4,543 acres; in rye, 238 acres; in tobacco, 123 acres.

*Cotton production*: 9,419 bales; average cotton product per acre, 0.42 bale, 600 pounds seed-cotton, or 200 pounds cotton lint.

Henderson is pre-eminently the summit county of the water-shed. From its high table-lands and ridges the Middle and South Forks of Forked Deer, Big Sandy, Beech, and White Oak rivers all take their rise, flowing off severally to all points of the compass. The forks of Forked Deer gather waters for the Mississippi; the other rivers are tributary to the Tennessee. Beech river has its head streams in the central portion of the county, flows eastward, receives tributary creeks from most of the eastern portion, and finally entering and crossing Decatur county empties into the Tennessee river. With many level areas, much of Henderson is rough and hilly. This is especially true of parts of the highlands which divide the western and eastern waters. Going both westward and eastward from this, the surface is less hilly, becoming finally, to the west especially, simply undulating.

The soils are the brown sandy loams of the uplands, rolling lands, branch and second bottoms, and the darker loam of creek bottoms. In the western parts of the county the sandy uplands and rolling lands are generally preferred for cotton; in the eastern and southeastern the second bottoms and bottoms are considered best. The deep formations are strata of laminated clays and sands, and to the east and southeast a greenish marly, more or less clayey, material, loaded with fossil shells, called greensand, or rotten limestone. The latter outcrops at intervals in the eastern and southeastern parts of the county, giving a rich dark soil and a stiff subsoil, often called "joint clay". (See page 21, under "Black Prairie Belt".) The deep formations, however, are often concealed by the beds of sand (and sometimes gravel) of the orange sand, which supply, in the main, the characteristic soils of sandy loam. In the growth of the higher lands red, post, and black oaks, and hickory are common, with black-jack oak and chestnut on the thinner lands. The chief crops are corn, cotton, wheat, oats, and potatoes. The growth on second and first bottoms includes white oak, sweet gum, beech, poplar, and hickory, with walnut, sugar-tree, etc. On the map showing for 1879 percentage of acres in cotton in given areas, it is seen that, with the exception of a strip in the northeastern corner, the percentage of the northwestern half of the county was from 10 to 15, and of the southeastern half from 1 to 5. In the part excepted it was intermediate, from 5 to 10. Cotton is shipped by water to Cincinnati at \$1 25, or to Mobile and New Orleans and Cincinnati at \$3 25 per bale.

## ABSTRACTS FROM REPORTS.

E. W. CUNNINGHAM (county generally).—The soils vary greatly, the southern sides of slopes being often sandy, while the northern sides are more clayey. Cotton on lowlands with deep soil inclines to run to weed, and sometimes is caught by early frost. Second bottoms are most reliable. Fresh black sandy uplands are well adapted to cotton, but burn in midsummer, causing the dropping of squares. The second bottom soil is cultivated easily in dry seasons, and is early, warm, and generally well drained. One-third of the crops is cotton; plants grow from 3 to 5 feet, the medium height best. The seed-cotton product per acre on fresh land is 800 pounds, 1,545 pounds making a bale of 475 pounds; staple rates middling. On land worked for three years the product is 500 pounds, 1,545 pounds making a bale; staple a shade inferior. The weeds are hog-weed, careless-weed, purslane, and crab-grass. Little of the land lies turned out, and is easily kept up. Such land taken in again produces too much weed the first year. Slopes wash seriously; valleys are much injured. Little horizontalizing and hillside ditching as yet, but so far as done the results are good.

The soil of hilly and rolling uplands is from 1 inch to 6 inches deep. Subsoil is coarse sandy. Land easily cultivated, and early and warm. One-third of the crops is cotton. The seed-cotton product per acre on fresh land is from 700 to 800 pounds, from 1,425 to 1,545 pounds making a 475-pound bale; staple is middling. After three years' cultivation the product is from 400 to 500 pounds per acre. One-fifth of the land lies turned out, and would produce well again if manured. Horizontalizing and hillside ditching are done with good results.

The brown clay loam of lowlands has a lighter clay subsoil. Tillage is easy in dry seasons, but difficult in wet. One-tenth of the crops is cotton, which grows from 4 to 6 feet high. Warm, wet weather inclines the plant to run to weed, which is restrained by throwing dirt off with a turning-plow. The seed-cotton product per acre on fresh land in dry seasons is from 600 to 1,000 pounds, 1,600 pounds making a bale. Staple rates well, being heavy. The land remains productive for years, and when overflow is escaped it makes the best cotton. The weeds are Spanish needle, butter-weed, etc. One-tenth of the land lies turned out, but it would produce well again if broken up deeply in the fall or winter.

W. C. TRICE (southwestern part of the county, uplands of Forked Deer headwaters).—The chief soil, the sandy loam, makes three-fourths of our lands. It is a mahogany, sometimes reddish clay loam, 4 inches thick, with a leachy subsoil. It is easily tilled in dry seasons, and is early, warm, and well drained. One-half of the crops is cotton, plants growing to 3 feet. Late planting and wet seasons cause the plant to run to weed, which is restrained by early planting and on hard beds. Seed-cotton product per acre on fresh land is 1,000 pounds, 1,600 pounds making a 475-pound bale. The staple rates as good middling. After five years' cultivation the product is 900 pounds, and after ten years' cultivation 700 pounds, in the latter case 1,660 pounds making a bale. Staple is one grade lower, or middling. Crab-grass and foxtail are troublesome. One-tenth of the land for from 6 to 10 miles in each direction lies turned out. Such land, if kept inclosed, improves; otherwise not. Slopes wash seriously; valleys much injured. A little hillside ditching is done with tolerable success.

JOHN PEARSON AND C. M. DAVIS (eastern part of the county, Beech river lands).—Hill-sides are sandy and very productive. The lands lying between the hills cover from 20 to 200 acres in a body. The uplands are generally black sandy, with red clay subsoil, and are easily cultivated in cotton. With good seed it never fails to have a stand. Fresh land will make three-fourths of a bale to the acre. Cotton on lowland generally matures, but sometimes the last-formed bolls are killed by frost. The soils are: (1) Upland black sandy, with red clay subsoil, best adapted to cotton; (2) second bottom, best adapted to corn. The first, the upland black sandy, is 6 inches thick. Tillage is easy in wet and dry seasons. The land is early, warm, and well drained. The chief crops are corn and cotton. One-half is planted in cotton. Plants grow to 3 and 4 feet, 4 feet being the best, and are restrained in a wet August by topping. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,660 pounds being required for a 475-pound bale; staple rates well. After four years' cultivation the product is 800 pounds, the same as above making a bale; staple not quite so good. The weeds are crab-grass and foxtail. One-fourth of the land lies turned out. When not gullied, would produce well again if manured. Slopes wash seriously; valleys damaged 25 per cent. Horizontalizing and hillside ditching have been done with complete success.



T. M. STUBBLEFIELD AND R. J. DYER (southeast from Lexington Cane Creek lands).—The soils cultivated in cotton are: (1) Black bottom, the best cotton land; (2) second bottom, good for cotton; (3) dark uplands with more or less clay. The black bottom soil is the chief, forming one-half of our lands, and occurring 5 miles east and west and 15 or 20 miles north and south. It is a fine, sandy clay loam, 12 inches thick, early, warm, and well drained, and about one-third is planted in cotton. Plants grow to 4 and 5 feet, and if too rank in wet weather in July and August they are restrained by topping and running around with a suitable plow. Seed-cotton product per acre on fresh land is from 1,100 to 1,500 pounds, 1,545 pounds making a 475-pound bale. Staple rates as good middling. The weeds are grass and cocklebur. About one-twentieth of the land is turned out, which would produce as other poor lands after the first year if taken in again. Soil washes on slopes, but not seriously; valleys injured thereby but little. Horizontalizing and hillside ditching have been done with good success.

F. G. ROGERS (southeastern part of county, lands of Cane and Flat creeks, waters of Beech river).—The soils cultivated in cotton are: (1) Light sandy of creek bottoms, above overflow; (2) yellow sandy upland on slopes, from 20 to 30 acres in places; (3) light sandy of Beech river. The chief soil, the light sandy of the bottoms, is in large proportion. The soil of the uplands is much the same, and has an average thickness of from 4 to 5 inches. The subsoil is a yellowish, sandy clay, which crumbles on exposure and mixes kindly with the soil, underlaid in places by sand or gravel, or rock, at 4 and 5 feet. Tillage of lower lands is difficult in wet seasons. Second bottoms are best for cotton. Plants grow to 3 and 5 feet, and topping is resorted to in wet seasons if necessary. Seed-cotton product on fresh second bottoms 1,300 pounds per acre, 1,425 pounds making a bale; staple first quality. After four years' cultivation the product is from 800 to 1,000 pounds per acre if gathered early, and the staple is better. The weeds are crab-grass and cocklebur. Not much of this land lies turned out; and when taken in again, it would produce from 500 to 700 pounds per acre.

P. B. McNATT AND A. H. FARNSWORTH (southeastern part of the county, lands of Hurricane and Middleton creeks, waters of the Tennessee river).—Cotton on the lowlands of Hurricane creek, based on greensand, is later and liable to be caught by frost; on the more sandy lands of Middleton creek it is earlier. Sandy bottoms are generally preferred; but if devoted to cotton, corn will have to be bought. The soils cultivated in cotton are: (1) Dark shell soil of Hurricane bottoms above overflow; (2) red upland, mostly in patches on slopes; (3) light and gray sandy bottom of Middleton creek. The first, the *dark shell soil*, forms about one-half of our lands on both lowland and upland, and occurs a long way north and south. White oak is a common growth. Thickness 10 inches. Subsoil, a tough red clay, which bakes hard when exposed, but crumbles to soil on cultivation. This soil is impervious when undisturbed, and contains fossil shells in places. Tillage is difficult in wet seasons, but not in dry. The soil is early, warm, and well drained. The crops are corn and cotton, some oats, and little wheat. The land is best adapted to corn, but makes fair cotton; and wheat does well when sown early. Nearly one-half of the crops is cotton. The plant grows to 3 and 5 feet, the latter the best. I know no remedy for plants going to weed. Seed-cotton product per acre on fresh land is from 500 to 700 pounds, 1,545 pounds making a bale of 475 pounds; staple good ordinary. On land cultivated for three years the product is from 800 to 1,000 pounds; the staple is then from one-half to a grade better, due to handling. The weeds are horse-weed and cocklebur. One-twentieth of the land lies turned out; if taken in again, produces according to wear and management. The slopes wash to some extent, and valleys are injured thereby 50 per cent. Annual efforts are made at horizontalizing and hillside ditching with moderate success.

The *red upland soil*, forming about one-third of cultivated lands, is a clay loam with little sand, 2 inches thick, which reddens with wear. The subsoil hardens in the sun, but mixes slowly with the soil; impervious when dry, and contains gravel in some places. Tillage is difficult in wet seasons, but easy in dry. Land is early when well drained, and is best adapted to cotton. About two-thirds of the crops are cotton. Plants grow to 1 foot and 2 feet high. Seed-cotton product per acre on fresh land is from 300 to 500 pounds, and about 1,545 pounds are needed for a 475-pound bale; staple good ordinary. On land cultivated three years the product per acre is from 500 to 700 pounds, 1,545 pounds, as before, making a bale; staple generally better. Weeds are rag-weed, crab-grass, and some cocklebur. One-third of the land lies turned out and is not reclaimed. Slopes wash seriously in places to the ruin of the valleys.

The *gray sandy soil* of Middleton creek forms about one-fourth of our lands, and occurs in a belt 2 miles wide along the course of the creek for a long distance; thickness 10 inches. Subsoil does not bake so hard, and mixes readily with the soil; contains some pebbles in places. Tillage is easier than in case of other soils. Land is early and well drained, and is best adapted to corn. About one-third of the crops is cotton. The weeds are smart-weed, cocklebur, and crab-grass. In other respects this soil is like the first.

#### McNAIRY.

*Population*: 17,271.—White, 14,845; colored, 2,426.

*Area*: 690 square miles.—Woodland, all, excepting an inconsiderable aggregate of marly and glady places; "bald knobs" in the southern and eastern parts of the county.

*Tilled lands*: 78,800 acres.—Area planted in cotton, 23,135 acres; in corn, 33,501 acres; in wheat, 6,726 acres; in oats, 5,093 acres; in tobacco, 95 acres.

*Cotton production*: 9,419 bales; average cotton product per acre, 0.41 bale, 579 pounds seed-cotton, or 193 pounds cotton lint.

McNairy is the most southerly of the summit counties, and is one of the southern tier lying contiguous to the state of Mississippi. It is rectangular and regular in form, its longer dimension extending north and south. The ridge or belt of highlands dividing the waters of the Mississippi from those of the Tennessee runs nearly straight, north and south, through the county, and has such a position as to throw the county into two very unequal portions, a larger and western one, drained by tributaries of the former river, and an eastern one, supplying headwaters for creeks emptying into the latter. The western slope affords much level or undulating table-land. To the southwest it is dissected and made more or less rolling or hilly by tributaries of the Hatchie river. Around Purdy, the county-seat, the country is more or less hilly. This town is on the border of an elevated area of the county northwest of the center, within which are the beginnings of many streams flowing off severally in opposite directions: to the northwest, waters of the South Fork of the Forked Deer; to the southwest, those of the Hatchie; to the east, those of the Tennessee.

The soils of the western portion are generally brown, siliceous, or sandy loams, mellow and productive, and well suited to the culture of cotton and corn. Fine level tracts, with numerous and fertile branch bottoms and gentle slopes, desirable farming regions, occur in the more western, northern, and southern parts of the county. Then again, at intervals, are sections of thinner uplands, denominated "barrens", with a growth of small oaks and hickories. Sandy lands make also a part of the eastern portion, and with them are many areas of darker and stiffer soils, based on the so-called "joint clay". The latter occur, too, on the dividing highlands in the southern part of the county. The belt of country including the stiffer soils begins with the Mississippi line, covering there the eastern half of the county, and extends a little east of north, through McNairy and the northwestern part of Hardin, into Henderson county.

Taking the whole county, the deep formations are mostly strata of sands, or of sands finely laminated with thin papery layers of clay, the whole often dark with fossil leaves or plant remains. Below these is the great stratum of "greensand", outcropping (where not covered by the superficial drift mentioned below) throughout the belt of the darker and stiffer soils referred to above, and supplying by natural changes the "joint clay" subsoil upon which they rest, and, where soils are absent, the "shell glades" and "bald knobs" of the southeastern and eastern parts of the county. (See also under Black Prairie Belt, page 21.) The deep formations, however, are often covered and concealed by the sands and sometimes gravel of the orange-sand drift. The mellow siliceous soils come chiefly from the latter. The "greensand" is less covered than the others, and is the surface stratum in many sections. The growth of best uplands and second bottoms includes white, red, and black oaks, hickory, dogwood, poplar, and beech, with elm, ash, papaw, red-bud, and some walnut, buckeye, and others. White, black, post, and black-jack oaks, with scrubby hickories, are common on the thinner uplands. The chief crops are corn, cotton, wheat, and oats, together with some rye, sweet and Irish potatoes, tobacco, and grasses. Most of the area of the county had in 1879 from 1 to 5 per cent. of total acreage planted in cotton. Much of the western and northwestern parts, and a strip running across the southern part, had more than this, from 5 to 10 per cent. Cotton is shipped by rail to Mobile and other places at from \$2 50 to \$3 per bale.

#### ABSTRACTS FROM REPORTS.

A. W. STOVALL (county generally).—The soils cultivated in cotton are: (1) Brown sandy, in hickory and hazel branch valleys, on slopes, etc.; (2) second bottom; (3) creek bottom. The *brown sandy soil* forms one-third of the cotton lands, is varied in character, and occurs in all sections of the county, excepting to the southeast. The growth is hickory, black-jack and black oaks, etc. The chief crops are cotton and corn, but the land is best adapted to cotton, which forms about one-half of the crops, but the plants hardly average 3 feet in height. The seed-cotton product per acre on fresh land is 1,000 pounds, from 1,485 to 1,600 pounds, with toll paid, making a bale; staple middling. After a few years' cultivation the product is greater, and the staple rates as good middling. Much of the hillsides lies turned out, and only last eight or ten years if not protected. (None of first and second bottoms are turned out.) Land turned out, if allowed to improve, does well; and if manured, does as well as ever. The soil washes considerably on the hillsides, but the valleys are not much injured. Hillside ditching is practiced successfully.

The *second bottom soil* exists in considerable amount, though the aggregate is small in proportion, being confined to a few sections of the county. The growth is white oak, hickory, beech, etc. Tillage is difficult in wet seasons, but less so in dry. The land is tolerably early; partly well drained, partly not. Cotton forms about one-fourth of the crops. Plants grow to 3 and 5 feet high. Topping is done by some when necessary. Seed-cotton product per acre on fresh land is from 1,000 to 1,200 pounds, the same quantity as before making a bale.

The *creek bottom soil* exists in considerable amount, but cotton is not generally raised upon it. The growth is white oak, gum, beech, etc.

W. J. SUTTON AND J. G. COMBS (southeastern part of the county and east of Purdy).—The larger portion of cotton is grown on lowlands, which yield greater than other lands, though frost sometimes is damaging. The soils cultivated in cotton are: (1) Black limy (greensand soil) bottom land, lying, respectively, south of Snake creek and east of Lick creek; (2) dark gray bottom lands of the same creeks, north of the former and east of the latter; (3) brown sandy loam of uplands. The *black limy bottom land* occurs in small proportion, extending 3 miles east and 6 miles north. The growth is gum, ash, hickory, poplar, black oak, and papaw. The soil is black and putty-like when wet, and the subsoil is a tough, dark yellow clay, which becomes like the soil on exposure, is impervious when undisturbed, and contains limy matter and fossil sea-shells, underlaid by sand at 20 feet. Tillage is rather difficult in wet seasons, but less so in dry. The chief crops are cotton, corn, wheat, oats, sweet and Irish potatoes, sorghum, clover, and grasses. The soil does well for all excepting sweet potatoes. Cotton forms one-fourth of the crops. Plants grow to 5 and 6 feet, but are best at 4 feet. They grow rank when wet and the land is too fresh, and are restrained by topping in July and August. The seed-cotton product per acre on fresh land is from 1,000 to 1,200 pounds, 1,425 pounds making a bale of 475 pounds; staple middling. On land cultivated for ten years the product is from 900 to 1,000 pounds per acre, 1,545 pounds making a bale; staple not so long. The weeds are cocklebur and smart-weed. Very little land lies turned out, but such land would produce well again.

The *dark gray soil* forms about one-third of the lands. The growth is gum, beech, white, and black oaks, hickory, and poplar. The soil is a gray loam, with some sand, from 3 to 10 inches thick; the subsoil a light yellow clay, impervious when undisturbed, and underlaid by clay at 5 feet. The land is best adapted to corn, cotton, and grasses. One-fourth of the crops is cotton. Seed-cotton product per acre is less by 200 pounds than on the first soil.

The *brown sandy loam* of the uplands described above forms the larger proportion, 85 per cent. of all, and the growth is chiefly black-jack, white, black, and post oaks, hickory, poplar, and hazel; thickness from 3 to 8 inches. The subsoil is a red sandy clay, underlaid by sand and some gravel at 20 feet. One-fifth of the crops is cotton. The seed-cotton product on fresh land is from 900 to 1,000 pounds per acre, 1,425 pounds making a bale of 475 pounds. Staple is middling. Slopes wash seriously, and the valleys are damaged thereby. Horizontalizing and hillside ditching are practiced with success.

J. H. MEES (eastern part of the county generally).—Farmers chiefly fear early frost in the fall, which, however, rarely occurs. The soils cultivated in cotton are: (1) Dark brown alluvial, mixed with sand of first bottoms, very productive; (2) lighter brown of second bottoms, less productive; (3) light gray, with sand of uplands or "barrens", productive when fresh. The *dark brown alluvial* is the chief soil, and forms one-fourth of the first and second bottoms. It extends north many miles, east to the Tennessee, south 12 miles to the state line, and west 2 or 3 miles. The growth is oak, poplar, gum, maple, beech, ash, walnut, mulberry, red-bud, dogwood, etc. The soil is a fine sandy clay loam, 7 inches thick. The subsoil is light yellow and friable, intermixed with fine sand, and underlaid by gravel at 18 feet. The land is early and warm, partly well and partly ill drained, and is best adapted to corn. Two-thirds of the crops is cotton. Plants average 3½ feet in height, and when growing rank are restrained by shallow and little plowing. The seed-cotton product per acre on fresh land is 1,200 pounds, 1,545 pounds or less making a 475-pound bale. All our cotton rates well when clean. On land cultivated for five years the product is less by 200 pounds per acre, 1,485 pounds making a bale; staple is better, when there is any difference. Crab-grass is the pest of the cotton-growers. One-twentieth of the land lies turned out, but not so much so as formerly. Considerable has been taken in, which produces well where not at first too much exhausted. Slopes do not wash badly. Some little hillside ditching is done with good success.

The second soil is a fine sandy loam of a lighter color from 3 to 6 inches in depth, and having the same extent as the first soil. The subsoil is a reddish clay, mixed with fine sand, friable, and underlaid by sand and gravel at 18 feet. Land is easily worked until very old, and is best adapted to corn, though cotton grows well. Cotton forms perhaps two-thirds of the crops. Plants grow to an average height of 2½ feet, and this is the best. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,425 pounds making a bale of 475 pounds, and the staple rates well. On land cultivated five years the product is 800 pounds per acre.

The *light gray soil* of the "barrens" makes one-half of our lands, and extends throughout the county. The growth is black-jack, black, Spanish, and post oaks, hickory, dogwood, etc. The soil is from 2 to 4 inches deep. The subsoil is reddish and friable, contains sand, and



is underlaid by sand and gravel at 16 feet. The land is best adapted to corn. Cotton forms two-thirds of crops, and grows to a height of 2 feet. The seed-cotton product per acre on fresh land is from 500 to 700 pounds, and the staple is as good as any. Slopes have not washed to any serious extent.

B. M. TILLMAN, J. H. ROWSEY, S. PLUNK, AND F. E. MILLER (northwestern and northern part of the county, Sweet-lips creek and waters of the Forked Deer river).—The climate is not so well adapted to cotton as the land, as the seasons are often too short. The black fine sand is the chief cotton soil. One-half its crops is cotton. Plants grow to 3 and 4 feet in height, 3 feet being the best. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,425 pounds making a bale of 475 pounds; staple middling. On land cultivated ten years the product is 600 pounds; but if manured the product may be from 1,600 to 1,800 pounds per acre. Crab-grass and foxtail are the only seriously troublesome weeds. A small proportion of the land lies turned out. Soils wash seriously on slopes, and the valleys are more or less injured. We check it by plowing on a dead level; have no hillside ditches.

The second soil, that of well-drained second and branch bottoms, produce per acre, when fresh, 800 pounds of seed-cotton, 1,425 pounds making a 475-pound bale; staple rates middling. After ten years' cultivation the land produces 600 pounds, but if manured, from 1,000 to 1,500 pounds; staple better, if there is any difference.

The gray uplands form the greatest portion, if woodlands are included. Black-jack, red, post, black, and Spanish oaks, and scrub hickory are common on these lands. The soil is 3 inches thick. One-half of the crops is cotton. The seed-cotton product per acre on fresh land is from 600 to 800 pounds per acre, 1,425 pounds making a 475-pound bale. The staple is middling when gathered early. On land cultivated ten years the product is from 600 to 800 pounds per acre. One-fourth of the land lies turned out, and is seldom taken in again unless lying well.

R. D. ANDERSON (southwest from Purdy; Oxford's creek, waters of Hatchie river).—Our best lands are branch and small valley lands on creeks. Hill land is being abandoned. Bottoms are preferred for cotton, and with a fair season will produce per acre three times as much as hillsides; yet the latter will make some cotton, even in wet weather. I may note as a fact that open blooms, wet by rain in the morning, never mature. The important cotton soils are those of bottoms or valleys, as follows: (1) Mulatto, sandy front-lands; (2) gravelly or buckshot back-lands. The *mulatto front-lands* is the chief soil, forming half the bottoms, the buckshot being the other half, and both together form an area three-fourths of a mile wide and 5 miles long. The soils of both average about 6 inches in depth. The subsoil of the first is sandy, leachy, and a brighter mulatto than the soil. The first soil is easily tilled in dry seasons, and in wet if well drained, and should be plowed when dry, but before becoming too dry; is late, but warm if well drained. The chief crops on both soils are corn, cotton, wheat, and oats, with some clover, millet, and herd's-grass. From one-third to one-half is planted in cotton. On first soil, the most productive, cotton grows to 4 feet. Plants become rank if wet in July and August, and there is no remedy. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,545 pounds making a 475-pound bale, including 24 pounds for bagging and ties; the staple is very fine. On land worked ten years the product is 800 pounds, 1,425 pounds making a bale; staple not quite so good. The weeds are crab-grass, cocklebur, and smart-weed. None of the valley land lies turned out. Land is sometimes seriously injured by washings from slopes. All thrifty farmers practice horizontalizing and hillside ditching, and with satisfactory results.

The *gravelly or buckshot* soil rests upon a gravelly subsoil, continuing down much the same for from 2 to 6 feet, and is then generally hard-pan and impervious. Excepting for weeds, tillage is easy in wet and dry seasons.

#### HARDIN.

(See "Western valley of the Tennessee river".)

#### DECATUR.

(See "Western valley of the Tennessee river".)

#### BENTON.

(See "Western valley of the Tennessee river".)

#### HARDEMAN.

(See "Brown-loam table-lands".)

#### MADISON.

(See "Brown-loam table-lands".)

### WESTERN VALLEY OF THE TENNESSEE RIVER.

This natural division, as limited in Part I, embraces much of Henry,\* the greater parts severally of Benton, Decatur, and Hardin counties, a little of McNairy,\* the northwestern corner of Wayne,\* and the western parts of Perry, Humphreys, Houston, and Stewart. Stewart and Houston are outside of the cotton region proper, and are not described. Stewart reported fifteen bales as the cotton product of 1879, and Houston four bales; but most of the cotton raised in Stewart, and all of that in Houston, was from parts of the counties within the limits of the Highland Rim to the east. For statistics of these counties see tables I and II, in Part I.

#### HENRY.

(See "Summit region of water-shed".)

#### BENTON.

*Population*: 9,780.—White, 9,147; colored, 633.

*Area*: 380 square miles.—Woodland, all.

*Tilled lands*: 46,425 acres.—Area planted in cotton, 4,923 acres; in corn, 24,788 acres; in wheat, 4,600 acres; in oats, 2,368 acres; in tobacco, 389 acres.

*Cotton production*: 1,801 bales; average cotton product per acre, 0.37 bale, 522 pounds seed-cotton, or 174 pounds cotton lint.

The Big Sandy and the Tennessee rivers both flow in northerly directions, gradually approaching, until they meet at an acute angle not far south of the Kentucky line. In the angle thus formed the long and narrow county of Benton is situated, placed, as if thrust in from the south, with its sharp northern end foremost. The Tennessee bounds it on the east and the Big Sandy for much of the distance on the west. It thus happens that Benton is chiefly a water-shed between two rivers. Its eastern margin, having a length along the river of 50 miles or more, is mostly made up of the rich alluvial bottoms of the Tennessee, averaging for the entire length nearly a mile in width. On the other side, for half the length of the western boundary, the bottoms of the Big Sandy make the western margin. The remainder of this boundary is a straight line running from a point on the Big Sandy directly south. The southwestern corner of the county is thus thrown out of the valley of the Big Sandy, and exceptionally upon the uplands of the water-shed.

The upland belt between the rivers has a varied surface, much of which is sandy, undulating, moderately fertile, and hilly. It is traversed by a multitude of creeks, some of large size, their valleys affording in the aggregate a great amount of good land. It must be noted that the "old shore" line spoken of on previous pages, or the junction of the hard rocks of Middle Tennessee with the soft strata of West Tennessee, passes through Benton. (See page 13, under "Outline of physical geography", and also under "Western valley of Tennessee river".) The eastern part of the county, therefore, including its northern end, is based on hard rocks, flinty, siliceo-calcareous rocks, and limestones, which often show themselves in bluffs and in the beds of creeks. The western part, on the other hand, has to a great extent a basis of laminated clays and sands. Over nearly all, however, excluding the alluvium of the Tennessee and other large streams, are strewn, sometimes thinly, the sands, and often the gravels, of the orange-sand drift. Going toward the valley of the Big Sandy sandy rolling lands predominate. Approaching the bottoms of the Tennessee the country breaks away in bluffs and spurs, often with cherty, gravelly surfaces and soils.

The soils on the uplands are comparatively thin, but areas of rich brown loams occur. The growth is hickory, poplar, chestnut, black-jack, black, white, and other small oaks. The most important soils are those of the first and second bottoms and gentle slopes. The black alluvial lands of the Tennessee are very productive, and would be first-class cotton lands were it not for overflows in spring, which often seriously delay planting. The first bottoms of the Big Sandy are low and wet, but the second bottoms and "long slopes", with their brown, mellow, sandy loams, are favorite grounds for cotton-growers. The numerous creek and branch valleys contribute largely to the aggregate of cotton lands. The growth of valley land is elm, poplar, hickory, hackberry, black, and white oaks, sugar-tree, beech, papaw, and, in the bottoms of the larger streams, cypress.

Benton is on the margin of the cotton region. On the map showing acreage in cotton it is divided nearly north and south into three belts. The western belt, in the southwestern part of the county, had in 1879, from 5 to 10 per cent. of its total area in cotton; the middle belt, a narrow one reaching farther north, from 1 to 5 per cent.; and the eastern, the larger part, extending through the entire length of the county, from 0.1 to 1 per cent. Cotton is shipped by rail to Nashville at \$1 or to Louisville at \$2 per bale.

#### ABSTRACT FROM REPORTS.

J. H. BRIDGES, W. F. MAIDEN, A. E. SWINDLE, AND P. M. MELTON (middle and northern parts of the county).—The soils cultivated in cotton are: (1) Dark gray of gently sloping upland; (2) dark loam of Sandy and Tennessee river bottoms; (3) flat-land soil, light-colored, and inclined to be stiff. The dark gray soil forms one-fifth of our lands. It is a clayey loam 5 inches thick. The subsoil bakes in the sun, but crumbles and mixes readily with the soil; is impervious when undisturbed, contains gravel, and is underlain by sand, gravel, or rock at from 1 foot to 3 feet. The land is early, warm, and well drained. The chief crops are corn, wheat, oats, cotton, tobacco, and potatoes, but the land is best adapted to corn and oats. One-fifth of the crops is cotton. Plants in places reach a height of 6 feet, but produce best at 3½ to 4 feet. They may overgrow when planted late and the season is wet, for which topping is advocated by some as a remedy. The seed-cotton product per acre on fresh land is 600 pounds, 1,660 pounds being required for a 475-pound bale; staple is ordinary. On land cultivated five years the product is 400 pounds; staple heavier, though shorter. The weeds are hog-weed, rag-weed, and crab-grass in wet weather. One-fifth of the land lies turned out, and if taken in again would produce well if manured. Slopes wash seriously in places; the valleys are not generally injured thereby, but very often are improved. Some horizontalizing and hillside ditching are done, with good results.

A. C. PRESSON (county generally.—For kinds of soils, etc., see page 24, Part I, under "Western valley of the Tennessee river").—The first soil, the black sandy of bottoms, is easily tilled in dry seasons, but with difficulty in wet. The crops are corn, wheat, cotton, tobacco, oats, potatoes, and peanuts. The land is best adapted to corn, cotton, and tobacco. About 2 per cent. of the cleared land is planted in cotton. Plants grow to 3½ feet, and are best at that. Cotton on fresh land in wet seasons may run to weed, and some restrain it by topping. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,570 pounds making a bale of 475 pounds; staple rates good. On land in cultivation ten years the product is 500 pounds per acre, 1,580 pounds making a bale; staple a little different. The weeds are crab-grass and cocklebur. No land lies turned out.

The second soil, the black sandy of level uplands, is a sandy clay loam 5 inches thick, easily tilled in dry and wet seasons; is early, warm, well drained, and is planted in cotton to the extent of 20 per cent. Plants grow to 3 feet, and are best at that. Seed-cotton product on fresh land is a little less than on first soils. Other points are as under first soil.

The third soil is the yellow sandy of rolling uplands. Subsoil on hillsides is sand; on tops of hills and level portions, yellow clay. The land is early, warm, and well drained. Most of the crops are cotton. Plants grow from 2½ to 3 feet high, the latter the best. The seed-cotton product per acre on fresh land is 600 pounds, 1,575 pounds making a 475-pound bale; staple rates well. On land worked six years the product is 500 pounds, 1,580 pounds making a bale. Chief weed, crab-grass. One-fourth of the land is turned out. Hilly lands, when once turned out, are never taken in again. Slopes wash seriously, but the valleys are but little damaged thereby. Horizontalizing and hillside ditching are practiced with very good results.

#### DECATUR.

Population: 8,498.—White, 7,276; colored, 1,222.

Area: 310 square miles.—Woodland, all, excepting a limited aggregate of marly limestone glades.

Tilled lands: 37,861 acres.—Area planted in cotton, 5,591 acres; in corn, 19,985 acres; in wheat, 3,829 acres; in oats, 2,701 acres; in tobacco, 59 acres.

Cotton production: 2,169 bales; average cotton product per acre, 0.39 bale, 552 pounds seed-cotton, or 184 pounds cotton lint.

Decatur county has a long, narrow, rectangular form, its length being more than three times its width. It lies lengthwise north and south, and is bounded on two sides (the eastern and southern) by the Tennessee river. The "old shore" line, or the junction of the soft strata of West Tennessee with the hard rocks of Middle Tennessee (see page 13, under "Outline of physical geography", and also under "Western valley of the Tennessee river"), runs longitudinally through the county, splitting it into a western, sandy, and higher belt, and an eastern, rocky, and lower one. The western belt is indeed the eastern border of the great sandy plateau slope of West Tennessee. Its high areas, table-lands, rolling lands, and hills supply the headwaters of many creeks flowing into the Beech and the Tennessee rivers. The Beech itself, rising farther west, flows eastward directly across both belts of the county. The rocky, or eastern, belt falls away to the bottoms of the Tennessee, though ridges continuous with the western highlands often run eastward a long way toward the river. The prevailing rocks off the ridges are limestones, often cherty, several beds of them marly, and forming at numerous points marly, glady places, destitute, or nearly destitute, of native growth. At the tops of the ridges are layers of flinty and calcareo-siliceous rocks, such as cap the high flat table-lands of Middle Tennessee east of the Tennessee river. Over all the strata of the county, alluvial bottoms excepted, the sands and gravels of the orange-sand drift have been deposited more or less continuously. In the western belt its sands prevail and cover the deeper strata to great extent; in the eastern, gravel is common, and the deposits are broken and occur at intervals. Here on high ridges beds of gravel, sand, and *débris* are met with. In such masses, at a number of localities, exist accumulations of iron ore of economic interest.

The chief soils may be grouped as follows: First, the dark alluvial of the rivers and larger creeks, of which there is a full share, with a native growth of white oak, poplar, hickory, ash, sweet and black gum, beech, walnut, sugar-tree, and elm, with cypress in the swampy back-lands; secondly, the brown sandy loams of the second bottoms, slopes, and branch valleys, with sandy or gravelly, or clayey subsoils, and a growth of oaks chiefly, with beech, hickory, walnut, and gum; and lastly, the thinner sandy soils of flat and hilly highlands, on which grow hickory, post and other oaks, and sometimes chestnut. Calcareous, clayey soils, based on limestones, are found in the eastern and southern portions. The Tennessee river washes the borders of the county for nearly 50 miles, and the bottoms occur along much of this distance. These bottoms are often more than a mile wide, and sometimes extend back 2 miles from the river. Then again they are narrowed and cut off by the running in of the highlands. Many of them present the characteristic features of "front-lands" and of lower, swampy, and cypress "back-lands". They must average for the whole length of the river not much, if any, less than 1 mile, the "front-lands" supplying an exceedingly valuable body of land.

The crops are those given at the head of this description, together with sorghum, peanuts, rye, pease, grasses, and potatoes. All the lands, excepting marshy lands, are cultivated more or less in corn and cotton, to which they are best adapted. The larger part of the county had in 1879 from 1 to 5 per cent. of its total area planted in cotton; but a strip in the southwestern part of the county, contiguous to the western boundary, had more, from 5 to 10 per cent., and the northeastern corner less, from 0.1 to 1 per cent. (See map of relative acreage in cotton.) Cotton is shipped, by river or rail, to Louisville or Cincinnati at from \$1 to \$1 50 per bale.

#### ABSTRACTS FROM REPORTS.

J. H. PEARCY, L. D. CRAWLEY, AND J. McMILLAN (county generally).—Cotton is a sure crop, and brings ready money. Women and children can work at it, which is a consideration. (For kinds of soil, etc., see Part I, under "Western valley of the Tennessee river".) The subsoil of the fresh sandy land is yellowish and reddish. On this soil plants grow to 3 feet, the best height. Topping about the 1st of August is practiced when plants run to weed on fresh land in wet weather. The seed-cotton product per acre on fresh land is 800 pounds, 1,485 pounds making a 475-pound bale; staple rates middling. On land worked five years the product is from 500 to 600 pounds for a few years, 1,600 pounds making a bale; staple not quite so good. Crab-grass is the pest. Ten per cent. of the land lies turned out. Horizontalizing and hillside ditching have been done with success in most cases.

On the *black sandy soil* on the river cotton grows from 2 to 6 feet in height, the highest being the most productive. Wet seasons incline the plant to become weedy, which is restrained by topping by the last of July or in August. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,600 pounds making a 475-pound bale; staple brought last season (1879) 12 cents. After the first year's cultivation the product is about the same; staple somewhat better. The weeds are crab-grass and cocklebur. Very little land, say one-thirtieth, lies turned out. The slopes wash seriously, and the valleys are injured thereby 5 per cent. Very little is done to check the damage.

The *black and clayey soil* on the creeks is early, warm, and tolerably well drained. Cotton grows to 2 and 5 feet, but is best at 3 feet. The seed-cotton product on fresh land is the same as on first soil; staple middling. On land cultivated six years the product is 800 pounds per acre, 1,545 pounds making a bale; staple good ordinary. The valleys are injured by washing of slopes 25 per cent. Other items as under first soil.

On the *hilly, clay loam* the growth is oak and hickory; depth of soil, 4 inches. Cotton grows to 2 feet. The seed-cotton product per acre on fresh land is 500 pounds, 1,660 pounds making a bale; staple good ordinary. After four years' cultivation the product is 200 pounds; staple not so good. Crab-grass is troublesome. One-fourth of the land lies turned out, and if taken in again would produce very poorly. Valleys are injured 25 per cent. by the washing of slopes. Other items as above.

W. H. BOGGAN, J. F. W. R., AND R. J. AKIN, AND R. T. SIMMONS (southern part of the county, Stewman's Creek and Tennessee River lands).—Uplands vary in areas from 1 acre to 100 acres. Cotton in low, wet lands is late in spring, becomes lousy, and is often caught by early fall frost. The soils cultivated in cotton are: (1) Black bottom lands, in bodies of from 16 to 100 acres, partly subject to overflow; (2) upland, mulatto or yellow, above overflow; (3) hill- and table-land, sandy soil in patches. The *black bottom lands* form 40 per cent. of all, and occur 10 miles east, 12 west, 3 north, and 8 miles south. It is a sandy clay loam (putty-like in small patches) of alternating black, brown, and yellow colors. The subsoil is a tough yellow, dark red, and white clay, gradually becoming like the soil upon cultivation, is impervious when undisturbed, often contains gravel, and is underlaid by sand, gravel, or limestone (cement-rock) at from 2 to 12 feet. The land is easily tilled in dry seasons, but with some difficulty in wet, and is best adapted to corn and cotton. Fifteen per cent. of crops are cotton. Plants grow from 2½ to 6 feet; are best at 3 feet. Bolling is favored by the use of fertilizers. The seed-cotton product per acre on fresh land is 850 pounds, 1,720 pounds making a 475-pound bale; staple middling to middling fair. On land worked five years the product is 700 pounds, and if well manured 2,000 pounds, 1,600 pounds making a bale; staple not so long or fine. The weeds are crab-grass, cocklebur, smart-weed, and careless-weed. No land lies turned out. The slopes wash to no great extent. Some hillside ditching has been done with good success.

## COTTON PRODUCTION IN TENNESSEE.

The *upland*, above overflow, which forms half the lands, extends off 8 or 12 miles in each direction, and is a clayey, often gravelly loam 6 inches deep. The subsoil is underlaid by sand or gravel, or limestone (cement-rock), at from 1 foot to 30 feet. Tillage is not usually troublesome in dry seasons, but is rather difficult in wet. (In other respects this soil is like first, with the exceptions below.) The seed-cotton product per acre on fresh land is 700 pounds; staple middling. On land worked five years the product is 650 pounds; if well manured, 2,000 pounds per acre. Two per cent. of the land lies turned out, and would produce, if taken in again, 600 pounds per acre.

The *hill- and table-land* forms 10 or 12 per cent. of the lands, and extends from 12 to 16 miles, bordering on heads of creeks and sand-hills. The growth is oak, hickory, poplar, chestnut, black gum, and sourwood. The soil is a sandy, gravelly clay loam of gray, yellow, or brown color, from 3 to 6 inches deep. The subsoil contains gravel at points of the hills, and is underlaid by sand and gravel and sand-rock at from 2 to 4 feet. The land is early, warm, and well drained, and is best adapted to cotton, which makes 4 per cent. of the crops. Plants grow to 18 and 30 inches, the latter the best. The seed-cotton product per acre on fresh land is from 400 to 600 pounds, 1,600 pounds making a 475-pound bale; staple middling. On land worked five years the product is from 300 to 450 pounds, 1,600 pounds making a bale; staple less fine and long, with a heavier coat on seed. Grass is the most troublesome. Five per cent. of the land lies turned out, and would produce from 250 to 500 pounds per acre if taken in again. The slopes do not wash badly, and the valleys are not injured.

D. M. SCOTT AND J. G. YARBOROUGH.—The yellowish, sandy soil of swells in the bottoms has a subsoil underlaid by sand and gravel at 50 feet. The tillage of soil in wet seasons is rather difficult, but is very easy in dry. The land is early when well drained. Cotton grows to 2 and 5 feet and higher; is best at 3 feet. Wet weather in July and August inclines the plants to run to weed, for which I know of no remedy. The seed-cotton product per acre on fresh land is from 1,000 to 1,500 pounds, 1,485 to 1,550 pounds, including bags and ties, making a 475-pound bale; staple good middling. On land under cultivation fifteen years the product is from 500 to 1,500 pounds, if manured to some extent; staple not differing essentially. The weeds are crab-grass, careless-weed and buffalo- or pig-weed. No land lies turned out.

## HARDIN.

*Population*: 14,793.—White, 12,775; colored, 2,018.

*Area*: 610 square miles.—Woodland, all, excepting a limited aggregate of marly limestone glades.

*Tilled lands*: 72,446 acres.—Area planted in cotton, 12,859 acres; in corn, 30,909 acres; in wheat, 5,445 acres; in oats, 3,387 acres; in tobacco, 88 acres.

*Cotton production*: 5,345 bales; average cotton product per acre, 0.42 bale, 591 pounds seed-cotton, or 197 pounds cotton lint.

Hardin is the only county in the western part of the state that lies on both sides of the Tennessee river. The states of Mississippi and Alabama corner on its southern boundary at a point nearly bisecting the boundary, and where, too, the Tennessee river enters the state of Tennessee. The county is rectangular in form, its longer dimension lying north and south, and is greatly varied in its topography, rocks, and soils. Lying on both sides of the river, it presents, indeed, characteristics of both Western and Middle Tennessee. If we divide the county into four approximately equal belts by lines running north and south, the western belt or quarter will have for its geological basis stratified sands and the "greensand" stratum pertaining to McNairy and other western counties, while the other belts will be based on solid rocks, limestones, shales, and flinty strata, representing a number of much older formations. The line cutting off the western quarter thus coincides with, and indeed is, the "old shore line", of which I have before spoken. (See page 13, under "Outline of physical geography", and also under the "Western valley of the Tennessee river".) The Tennessee river coincides for a good part of its course with the same "shore line". Entering the county, with hard rocks on both sides, the river curves to the west until it reaches the "shore line", and then flows northward, with sandy bluffs on the western side and rocky ones on the eastern. At a point about two-thirds of the way through the county the river, bending to the northeast, leaves the "shore line" and enters the area of the hard rocks, escaping finally from the county at its northeastern corner. It thus happens that limestones are found in the extreme northern and southern parts of the county west of the Tennessee. In any section of Hardin, even upon the highest ridges of the eastern portion, scattered patches of the sand and gravel of the orange-sand drift may be met with resting upon all the deeper strata and rocks mentioned.

The Tennessee river, in bending as it does through the county, has a long immediate valley. This includes many rich bottoms, but is in the main rougher than we would look for in the valley of so great a stream. Going west from the river bottoms the country, though broken, has level areas interspersed, which rise into ridges between the creek valleys as we approach the western boundary. The soils west of the "shore line" are sandy, often mellow and fertile, and, in the northwestern part of the county especially, alternate more or less with the stiffer soils of the "greensand" formation. Going east from the river the country presents varied features, and in the southern part of the county the high table-lands of the Highland Rim are soon met with. East of Savannah there is an area of post-oak flatwoods resting upon sand and gravel.

Most of the northeastern part of Hardin is a rolling limestone region, supplying more or less good land, and in places marly glades, nearly naked, or spotted with clumps of small cedars. Within this section are several large creeks, with valleys of good land. East and southeast of the central portion are heavy, often flat-topped ridges, interlocked with narrow valleys. Farther to the southeast the country is chiefly high table-land, resting upon the great Highland Rim, with calcareo-siliceous, flinty, and sometimes cherty limestone rocks. The soils are thin, though better areas on the branches are interspersed. The main rim sweeps around from the Tennessee river, in the southern part of the county, northeasterly into Wayne. Many ridges in the northeastern part of Hardin are but spurs, in places reduced to lines of hills, running out westerly and northwesterly from the rim.

The chief crops are corn and cotton. For most of the county the acreage planted in cotton in 1879, as compared with total area, was from 1 to 5 per cent.; for the western third of the county, excepting a fraction at the southern end, it was more—from 5 to 10 per cent. Cotton is shipped to Cincinnati and Louisville at \$1 50 per bale.

## ABSTRACTS FROM REPORTS.

J. C. MITCHELL (northwestern part of the county, west of Tennessee river.—For remarks, kinds of soils, etc., see pages 24, 25).—On the first soil, black upland, lying on hillsides and branch bottoms, cotton grows to 2 and 5 feet in height, but is best at 3 feet. Wet seasons incline the plant to run to weed; topping is often done, and is said to be beneficial. Seed-cotton product per acre on fresh land is 700 pounds, 1,600 pounds making a 475-pound bale; staple low middling. On land cultivated five years the product on upland is from 300 to

400 pounds, and on bottoms 600 pounds, 1,545 pounds making a bale; staple about the same. The weeds are crab-grass and cocklebur. One-third of the land lies turned out, but if taken in again it would produce well. Slopes wash seriously, and valleys are considerably damaged thereby. Horizontalizing is done to a limited extent, and with good success so far as tried.

On the dark loam of the Tennessee River bottom cotton grows to 5 and 10 feet. The seed-cotton product per acre on fresh land is from 500 to 1,500 pounds, 2,140 pounds making a 475-pound bale; staple good ordinary. On land cultivated for five years the product is about the same, 2,010 pounds making a bale; staple of some rates low middling. The weeds are cocklebur and crab-grass. Land is only turned out when overflows wash it into gullies.

On the sandy bottom soil, near the river bank, cotton grows to a height of 5 or 10 feet. The seed-cotton product per acre on fresh land is from 1,000 to 1,800 pounds, 1,900 pounds making a bale of 475 pounds; staple middling. On land cultivated fifteen years the product and the staple are the same as on fresh land. Cocklebur is the troublesome weed. No land lies turned out unless gullied. Slopes gully readily, but nothing is done to check the damage.

J. W. IRWIN (central part of the county, east of Tennessee river).—On the black sandy soil of creek and river bottoms cotton grows to a height of from 3 to 7 feet, 5 feet being the best. To check growth in wet seasons thinning and topping are resorted to. Seed-cotton product per acre on fresh land is from 1,000 to 1,200 pounds, 1,660 pounds making a 475-pound bale; staple low middling. On land worked five years the product is about the same, as the roots are killed by that time, 1,600 pounds making a bale; staple finer but shorter. The weeds are island-weed, morning-glory, and cocklebur. Land is only turned out when washed. Slopes wash readily, but the damage is not serious, and is checked by permitting small undergrowth to take the land.

On the soil of second bottoms and slopes (so-called "ridge land") cotton grows to 2½ and 4 feet. Plants grow rank only in very wet seasons, and topping is rarely necessary on upland. The seed-cotton product per acre on fresh land is from 800 to 1,000 pounds, 1,660 pounds making a bale of 475 pounds; staple middling. On land cultivated five years the product is from 400 to 750 pounds, 1,600 pounds making a bale; staple finer. One-third of the land lies turned out; but if taken in again, and not washed, would produce well. The slopes wash seriously, and the valleys are injured thereby 25 per cent. Very little is done to check damage, our people not yet realizing the importance of saving and restoring land.

On the soil of the flatwoods cotton grows from 2 to 3½ feet, and rarely needs topping. The seed-cotton product per acre on fresh land is from 600 to 800 pounds, 1,600 pounds making a 475-pound bale; staple middling. On land worked five years the product is 400 pounds; staple finer. Weed crab-grass. One-half this land lies turned out; but if taken in again it would produce nearly as well as at first. Slopes wash seriously, and little is done to check the damage.

#### McNAIRY.

(See "Summit region of the water-shed".)

#### WAYNE.

(See "The Highland Rim".)

#### PERRY.

*Population:* 7,174.—White, 6,609; colored, 565.

*Area:* 400 square miles.—Woodland, all, excepting a small aggregate of marly limestone glades.

*Tilled lands:* 35,422 acres.—Area planted in cotton, 452 acres; in corn, 15,007 acres; in wheat, 3,113 acres; in oats, 1,461 acres; in tobacco, 29 acres.

*Cotton production:* 196 bales; average cotton product per acre, 0.43 bale, 618 pounds seed-cotton, or 206 pounds cotton lint.

Perry and the county contiguous on the north (Humphreys) contribute a long central portion to the eastern slope of the western valley of the Tennessee. Both counties have the Tennessee for their western boundary. Perry has Wayne to the south of it and Hardin to the southwest. The diagonal corners of Perry and Hardin would nearly touch but for the northwestern corner of Wayne, which is thrust between them and borders the Tennessee for a number of miles. Perry is approximately rectangular in form, nearly twice as long as wide, with the longer dimension north and south. Its topography is easily understood. Parallel with the Tennessee river, and running in the same direction to the north through the eastern part of the county, is Buffalo river, with a well-marked valley. Conceiving the county to be split into four equal belts by three lines running north and south, the most easterly line will mark the place of Buffalo river, throwing one-fourth of the county to the east of that stream, and the middle line will nearly coincide with a high ridge 300 or 400 feet above adjacent valleys, a "divide" between the waters of Buffalo river and the Tennessee. We say "nearly coincide", for the course of the divide lies a little east of the line and crowds upon the Buffalo valley, greatly narrowing its western slope. Half or more of the county forms a belt west of the divide. The county as a whole is thus seen to consist of parallel and unequal sections lying lengthwise within its bounds. The divide sends off numerous spurs westward toward the Tennessee river, arranged quite regularly, like teeth in a comb. Between these are many creek valleys, based on limestone, which widen as we descend toward the river, supplying many rich bottoms, with fair second bottoms and slopes. Reaching the river, we find at intervals along its course the characteristic alluvial lands, though the aggregate of these is less than on the western bank.

The western slope of the Buffalo valley, from the river to the divide, is narrow, with short, swift streams. The eastern slope is quite different. Within the limits of Perry, outside of the river bottoms, it shows the ends of many spurs jutting into the county from the east, and between them the lower parts of as many creeks flowing into the Buffalo. Curiously, the ends of the spurs are the ends of the teeth of another comby topography such as we have in the western half of Perry. The back of the second comb, or the second "divide", lies in sections of Hickman and Lewis, contiguous to Perry, and from it spurs (broad and flat-topped here for much of their course) extend off westward toward the Buffalo, as in the other case they do toward the Tennessee. Between these are many valleys, a good part based on limestone, which widen and supply bottoms and other good lands until the immediate valley of the Buffalo is reached. Both combs lie with their teeth in the same direction and their backs nearly parallel.

Buffalo and the creeks of the eastern portion all have valleys with a fair proportion of rich, mellow bottom lands. The slopes are generally in cultivation, supplying often very desirable farming tracts, with siliceous or

calcareous soils, based on clayey subsoils. The ridges are capped with siliceous rocks, the soils of which are thin and unproductive. As in other counties of this part of the state, patches of gravel of the orange-sand drift are occasionally met with.

The chief crops of Perry are corn, wheat, oats, and peanuts, with some cotton, potatoes, and tobacco. Cotton was once more largely cultivated than now. The census of 1870 gave 495 bales (400 pounds each) as the product of 1869; we have reported only 196 bales (475 pounds each). This falling off, amounting to 220 standard bales of 475 pounds each, is in good part due to the substitution of the culture of peanuts for that of cotton. On the map of acreage in cotton it is seen that three-fourths of the county had in 1879 less than 0.1 per cent. of total area in cotton. Most of the cotton was raised in the southern part. A strip on the southern boundary shows from 1 to 5 per cent.; another, next north, from 1 to 0.1 per cent.

#### HUMPHREYS.

*Population:* 11,379.—White, 9,708; colored, 1,671.

*Area:* 450 square miles.—Woodland, all.

*Tilled lands:* 53,938 acres.—Area planted in cotton, 155 acres; in corn, 26,387 acres; in wheat, 5,426 acres; in oats, 1,988 acres; in tobacco, 33 acres.

*Cotton production:* 90 bales; average cotton product per acre, 0.58 bale, 828 pounds seed-cotton, or 276 pounds cotton lint.

It is only the southern part of Humphreys county that can lay any claim, so far as actual products are concerned, to be within the cotton-growing region, and the claim for this part is a feeble one. The county lies north of Perry, and with it contributes, as stated in the description of the latter county, a long central portion to the eastern slope of the western valley of the Tennessee river. The Tennessee bounds it on the west. Its middle and eastern parts are mainly high table-lands, forming a section of the great Highland Rim of Middle Tennessee. We may say, in fact, that the whole county is an elevated table-land, sloping off on the west as it approaches the lowlands of the Tennessee river, and is channeled throughout by water-courses running more or less westerly. Its southern part is cut across by the curving valley of Duck river, with which, coming from the south, Buffalo valley unites. Large creeks rise in the eastern and northeastern parts of the county and beyond the boundary, in the margin of Dickson county, next east, of which some flow southwestward into Duck river, and others westward into the Tennessee. The latter widen as they approach the river.

The valleys supply substantially the productive lands. The bottoms and gentle slopes of the creeks, based on calcareo-siliceous rocks, sometimes on limestones, and often on cherty gravel, are usually mellow siliceous loams, and are everywhere in cultivation. The valleys of Duck and Buffalo rivers, in which most of the cotton is raised, have bottoms, some of large size, noted for their mellowness and fertility. In addition, the Tennessee river, washing the western side of the county for 30 miles, contributes a large and important quota of dark sandy alluvium. The native growth of the valleys is heavy, and includes many species, among which white, black, and red oaks, poplar, walnut, sweet gum, hickory, ash, and beech may be mentioned. The leading crops are corn, peanuts, wheat, and oats, but some attention is given to rye, tobacco, potatoes, clover, and grasses. Peanuts take the place of cotton as a ready-money product. The table-lands are chiefly in open woods, often denominated "barrens", and are very sparsely settled—for miles not at all. They have thin soils, little productive. The growth is black, red, white, post, and Spanish oaks, hickory, dogwood, and black gum, with sometimes black-jack, chestnut, and occasionally poplar. On the map of relative acreage planted in cotton in 1879 the southern part only is regarded, and there the acreage in cotton is represented as less than one-thousandth of the total area. Cotton is shipped to Cincinnati at \$1 50 per bale.

#### ABSTRACTS FROM REPORTS.

W. J. WHITE AND W. D. KING (southern part of the county).—But little cotton is planted. The peanut crop is the most important, farmers resorting to it after enough corn and wheat are planted to supply bread. The kinds of soil cultivated in cotton are: (1) Bottom; (2) upland and second bottom. One-third of all our lands is good for cotton. On the first soil cotton grows to 3 and 6 feet high, but is best at 4 feet. Wet seasons and soils too rich cause plants to grow rank, for which I know of no remedy. The seed-cotton product per acre on fresh land is from 800 to 1,500 pounds, 1,780 pounds making a 475-pound bale. Staple rates low middling to middling. Culture of cotton injures the land but little. The weeds are rag-weed, smart-weed, purslane, careless-weed, and crab-grass. Little, if any, of this land lies turned out.

The upland and second bottom soil forms one-half the cultivated lands, and occurs up and down the valleys of Duck and Buffalo rivers. It is a fine sandy and gravelly loam of a gray, yellowish, or blackish color, from 3 to 12 inches thick. Cotton grows upon it 3 and 6 feet high, 4 feet being the best. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,780 pounds making a bale of 47½ pounds; staple rates as low middling. No land worth noting lies turned out. The slopes do not wash seriously, and not much effort is made to check the damage.



THE HIGHLANDS, OR HIGHLAND RIM OF MIDDLE TENNESSEE.

In Part I, under the head of "The Highland Rim", this natural division is considered to consist of two parts, a western and an eastern, and the counties included, or partly included, in each were enumerated. Under the same head the character of the division as a cotton-producing area is noticed.

HIGHLAND RIM (WESTERN SUBDIVISION).

This subdivision embraces all or parts of Hardin,\* Wayne, Lawrence, Lewis, Perry,\* Hickman, Humphreys,\* Dickson, Cheatham, Robertson, Montgomery, Stewart, Giles,\* Maury,\* Williamson,\* Sumner,\* and Davidson.\* The counties of Dickson, Cheatham, Robertson, Montgomery, and Stewart are outside of the cotton region proper, or in the "penumbral region" of cotton culture. Montgomery and Cheatham produced in 1879 but 2 bales each, Dickson 31 bales, and Robertson none. The cotton reported from Houston, 4 bales, and much of that from Stewart, 15 bales, was from lands within this subdivision. (For the statistics of these counties see Tables I and II in Part I.) These "penumbral" counties are not separately described, and the reader is referred to the general descriptions of the regions represented in each.

HARDIN.

(See "Western valley of the Tennessee river".)

WAYNE.

*Population:* 11,301.—White, 10,232; colored, 1,069.

*Area:* 710 square miles.—Woodland, all.

*Tilled lands:* 56,456 acres.—Area planted in cotton, 3,265 acres; in corn, 25,674 acres; in wheat, 8,791 acres; in oats, 2,109 acres; in rye, 505 acres; in tobacco, 63 acres.

*Cotton production:* 1,207 bales; average cotton product per acre, 0.37 bale, 528 pounds seed-cotton, or 176 pounds cotton lint.

Wayne county, resting upon the southern boundary of the state, is a characteristic county of the Highland Rim, to which division it all belongs, excepting its northwestern corner. The part excepted is washed by the Tennessee river for 10 miles or more, and contains a fair proportion of alluvial lands, and back of the bottoms there is much rolling limestone, often glady land. In the main the county is a high, flat table-land from 800 to 1,000 feet above the sea. Within its central portions are the headwaters of numerous creeks, which flow in all directions. The northwestern portion breaks down into the rolling and glady limestone lands referred to, and constitutes the section of the county belonging to the western valley of the Tennessee river. Within it are a few long spurs from the highlands reaching out far toward the river. The northeastern portion crowds upon the valley of Buffalo river, the limit in that direction. Many of the creeks, before passing the boundaries of the county, become considerable streams, and cut deeply into the table-land down to underlying limestone rocks, thereby supplying long, narrow valleys of strong, arable lands.

Indian and Hardin's creeks, flowing westward and then northwestward through Hardin county into the Tennessee, have valleys especially deep. Many others are but little less so.

The rocks of the county are first, at top, siliceous or calcareo-siliceous beds, surmounted in some regions with cherty limestones, making the floor of the highlands; and, secondly, below these, grayish and reddish marly limestone, outcropping in the valleys and on the lowland slopes of the northeastern portion. As in other counties bordering on the Tennessee river, the marly limestones outcrop here and there, forming glades, bespotted with clumps of cedars. Upon any of the strata of the county, high or low, it is no unusual thing to meet with patches of gravel, outliers of the orange-sand drift.

The soils of the highlands are poor and thin, and miles may be traveled through the woods without meeting with a house or a hut. Oaks of moderate size prevail (white, black, chestnut, black-jack, post, and others), and with these are poplar, chestnut, and, in the southern part of the county especially, yellow pine. The timber on rolling lands is better than that of the flatwoods. The farming lands are substantially confined to the valleys, the lands of which are often rich, the soils mellow, and subsoils clayey and gravelly, producing corn, cotton, wheat, oats, rye, sorghum, peanuts, tobacco, and hay. The cotton product in 1869, according to census reports, was 1,101 bales of 400 pounds each, as against 1,207 bales of 475 pounds each in 1879. The map of relative acreage in cotton shows that the western and southern portions had in 1879 the greatest per cent. of area in cotton, namely, from 1 to 5 per cent., and the northwestern part the least, below one-tenth of 1 per cent., while an intermediate strip had from one-tenth to 1 per cent.

LAWRENCE.

*Population:* 10,383.—White, 9,599; colored, 784.

*Area:* 590 square miles.—Woodland, all.

*Tilled lands:* 47,855 acres.—Area planted in cotton, 1,830 acres; in corn, 21,673 acres; in wheat, 8,053 acres; in oats, 2,812 acres; in rye, 357 acres; in tobacco, 31 acres.

*Cotton production:* 702 bales; average cotton product per acre, 0.38 bale, 546 pounds seed-cotton, or 182 pounds cotton lint.

Lawrence is one of the southern tier of counties, and rests upon the Alabama line, and is the second county west of the longitude of Nashville. It is a typical area of the Highland Rim. The wooded flatlands and rolling

surfaces are often more than 1,000 feet above the sea, and from 300 to 400 feet above the floor of the Central Basin to the east. From a belt lying east and west, north of the center, some of the branches and creeks run northward to form Buffalo river, and others southward to form the most important stream of the county, Shoal creek. The latter flows diagonally through the larger portion of the county, escaping at the southwestern corner. Sugar and Blue Water are other creeks in the southeastern and southern portions. High table-lands prevail in the county, supporting a growth of black, red, white, post, chestnut, and black-jack oaks, chestnut, black gum, dogwood, and occasionally hickories and poplars. More favored areas, however, occur with a stronger soil and timber of a better class. The northern part is made rolling or hilly by the tributaries of Buffalo river, while the southern part is cut deeply into by the rapid creeks of that section, and the continuity of the table-lands is much broken by the valleys, often wide and fertile, of these streams. The formations of the highlands are those characteristic of the Highland Rim, calcareo-siliceous rocks, with which are limestones more or less cherty. The deepest valleys in the southern portion of the county are cut down through these, exposing the lower gray and blue limestones. The lands of the county have been classified as follows: Bottoms and second bottoms; rich hill lands near the creeks; less productive hill lands farther from the creeks; first quality of table-land, second quality of table-land, or the "barrens". The crops are given above. For most of the county the percentage of total area planted in cotton was in 1879 less than 0.1; in the southwestern and southeastern corners it was greatest, from 1 to 5.

#### ABSTRACT FROM REPORT.

**N. M. HOLLIS** (southwestern part of the county, waters of Shoal creek).—Neither soil nor climate is well suited to cotton. The soils cultivated in cotton are: (1) Second bottom; (2) third bottoms, southeastern and western hillsides; (3) hill-top. The *second bottom soil* is a gravelly dark loam, forming about one-tenth of our lands. It does not occur in great bodies, and is confined to creek valleys, which are separated by hills and table-lands. The growth is hickory, walnut, poplar, chestnut, ash, a variety of oaks, beech, persimmon, sugar-tree, gum, elm, and hackberry. The subsoil contains angular gravel, and is underlaid by gravel or rocks at 3 feet. The land is naturally well drained, and is best adapted to corn, vegetables, clover, and grasses. About one-tenth of the crops is cotton. Plants grow from 2 to 6 feet high, but are best at from 3 to 3½ feet. Late rains and too late cultivation incline the plants to run to weed. The use of fertilizers, early and good cultivation, and topping in August are the remedies. The seed-cotton product per acre on fresh land is from 800 to 1,000 pounds, 1,425 pounds making a 475-pound bale; staple good ordinary. After twenty years' cultivation the seed-cotton product per acre is from 500 to 600 pounds, and with manure 1,000 pounds, 1,485 pounds then making a bale; staple same as before. The weeds are cocklebur, crab-grass, and ground ivy. None or but little of the land lies turned out. Slopes do not wash seriously. Little is done to check the damage.

The *third bottom or hillside soil* exists in small proportion and over short distances. Growth, small kinds of oaks, poplar, chestnut, hickory, persimmon, and sassafras. The soil is a gravelly clay loam from 3 to 12 inches thick. The subsoil is more or less impervious, contains angular gravel, and is underlaid by gravel and rock at 3 feet. The land is easily tilled in dry weather, and one-tenth of the crops is cotton. Plants grow to 2½ and 3 feet. The seed-cotton product per acre on fresh land is from 600 to 700 pounds, 1,425 pounds making a 475-pound bale; staple good ordinary. After fifteen years' cultivation the product is from 300 to 500 pounds, and with manure from 600 to 700 pounds; staple about the same. Crab-grass is troublesome. One-tenth of the land lies turned out, and would produce well again if manured. The slopes in some instances wash seriously, but the valleys are little injured by it. Some little horizontalizing is done, with moderate results.

The *hill-top or highland soil* makes over half the lands, and extends widely in all directions. It is a gray or yellowish loam. The subsoil contains gray, angular gravel, with rock or gravel below. The land is early and warm, is naturally well drained, and is best adapted to wheat and corn. One-fifteenth of the crops is cotton. Plants grow from 2 to 2½ feet high. The seed-cotton product per acre on fresh land is from 300 to 400 pounds, 1,425 pounds making a 475-pound bale; staple good middling. After ten years' cultivation the product is from 200 to 400 pounds, or with manure from 400 to 500, 1,485 pounds then making a bale; staple about the same. The weeds are grass and rag-weed. One-fifth of the land lies turned out, and very of little such land is taken in again. Slopes wash seriously, but the valleys are not much injured. Little is done to check the damage.

#### LEWIS.

*Population*: 2,181.—White, 1,963; colored, 218.

*Area*: 360 square miles.—Woodland, all.

*Tilled lands*: 11,654 acres.—Area planted in cotton, 229 acres; in corn, 5,272 acres; in wheat, 1,139 acres; in oats, 339 acres; in tobacco, 7 acres.

*Cotton production*: 102 bales; average cotton product per acre, 0.45 bale, 636 pounds seed-cotton, or 212 pounds cotton lint.

Lewis county occupies a central position in that section of the Highland Rim which lies between the valley of Duck river and the Alabama line. It is one of the small counties of the state, is twice as long as it is wide, and lies lengthwise east and west between Hickman on the north and Wayne and Lawrence on the south. It is a high, wooded table-land with thin soils, bearing a growth of red and black oaks, chestnut, tough poplars, called "blue poplars", small hickories, and other similar growth. Long distances may be passed without the sight of a field or a human habitation, and such is the county in the main. The table-land, however, is traversed by the valleys of many creeks, in which the cultivated land lies and the people live. The population of the county is very small, and less than that of any other county in the state. There are but six inhabitants to the square mile, while Maury, lying next east, in the Central Basin, has nearly sixty-eight to the mile. The wildness of the uplands becomes apparent when it is considered that the scanty population is substantially confined to the valleys. Buffalo river lies to the south, in a portion of its course flowing westward through an angle of the county, and in another portion making a part of the southern boundary. This river, flowing to the west beyond the county for 5 miles or thereabout, turns squarely to the north and runs through Perry county, thus becoming parallel, though not contiguous, to the western boundary of Lewis. We may say that Lewis, with a small rectangular section of Perry, lies in the great angle of Buffalo river. The central highlands of the county embrace the headwaters of numerous creeks, flowing off severally in all directions. Swan creek, having the heads of its chief tributaries in the eastern and northern portions, flows northward and empties into Duck river in Hickman county. Cane creek rises in the northern portion, flows northwestward through a corner of Hickman, and unites with the Buffalo in Perry. Smaller creeks rise on the highlands of the western margin, and flow westward to the Buffalo in the same county. Trace, Big Rock House, and

Grinder's creeks, mostly with fertile valleys, rise in the central portions and flow southward into the Buffalo. In the small fraction on the south side of the Buffalo, cut off by the river, are lower parts of other creeks heading in Lawrence.

The rocks of the highlands consist of calcareo-siliceous beds, with here and there limestones, generally cherty. Below these lie gray limestones of an older age. Black and greenish shales often separate the two series. Resting upon these in the highlands or in the valleys one may occasionally meet with outlying patches of the orange-sand drift—gravel beds, in which at some points iron ore has accumulated in sufficient quantity to make an "ore bank" of value. The deepest portions of the creek valleys reach down to the gray limestones, and these supply a moderate proportion of the soils of the second bottoms or sloping lands. Much of the valley land, however, is based on the higher beds. The soils may be classified as follows: The alluvial of the bottoms, the gravelly soils of slopes and rolling lands, and the thin soils of the highlands. The first are very rich, and the second often mellow and productive. The chief crops are corn, wheat, peanuts, oats, and cotton, with some rye and barley. On the map of relative acreage in cotton the county is seen to have had in 1879 less than 0.1 per cent. of its total area in cotton.

# PERRY.

(See "Western valley of the Tennessee river".)

# HICKMAN.

*Population:* 12,095.—White, 9,849; colored, 2,246.

*Area:* 610 square miles.—Woodland, all.

*Tilled lands:* 71,970 acres.—Area planted in cotton, 3,128 acres; in corn, 30,716 acres; in wheat, 7,874 acres; in oats, 2,896 acres; in rye, 225 acres; in tobacco, 51 acres.

*Cotton production:* 1,302 bales; average cotton product per acre, 0.42 bale, 594 pounds seed-cotton, or 198 pounds cotton lint.

Hickman is the central county of the western subdivision of the Highland Rim. It is nearly square in form, and is set a little obliquely to the cardinal points, its eastern and western sides ranging east of north. The county, as a whole, is a table-land nearly 1,000 feet above the sea. It is, however, so seriously cut into by the valleys of rivers and a score of creeks that its characteristics as a table-land are not always recognizable. It is cut up rather symmetrically by the streams. The tortuous Duck river, flowing north of west through the county, cuts it into two nearly equal parts. Piney river, Lick creek, and other creeks, tributaries of the Duck river, with their sprays of smaller streams, divide the northern part into varied sections, wide plateau areas or flat-topped ridges, or, it may be, render the surface rolling and hilly, and Swan and Beaver Dam creeks, with their sprays of streams, do the same thing for the southern part. High flat lands abound in the extreme northern and southern portions of the county.

The strata of the highlands and ridges are calcareo-siliceous rocks and cherty limestones, yielding a thin, poorly remunerative soil, with a growth characterized by red, black, chestnut, post, and black-jack oaks, with hickories, chestnut, and some poplars. Much of the county is of this character, and long stretches of country occur without inhabitants; yet there are large exceptional areas with rolling surface, in which the lands are much better, the timber heavier and of a better class, and the soils, especially along the streams, under cultivation.

The deep valleys, cut down from 300 to 500 feet below the general level of the highlands, expose the strata underlying the rocks of the latter, chiefly gray and blue limestones. These limestones, with the alluvial bottoms, supply the best and the main producing lands of Hickman. They have their greatest outcrop in the eastern part of the county, where the Duck River valley and the creek valleys, such as those of Swan and Lick creeks, are the widest. (a) In the western part of the county their outcrop (owing to a local dip of strata to the west) is confined to the lowland levels of the Duck river. Rich alluvial and fair sloping lands, however, occur at intervals along the whole length of the river to the western boundary. Piney valley is chiefly (due to the westerly dip) in the siliceo-calcareous and cherty limestone strata noticed as pertaining to the highlands, and does not cut down to the gray and blue limestones until within a few miles of the Duck river. It is, however, often wide, with many rich and desirable farming sections, embracing bottoms and sloping lands. Its soils are generally very gravelly, made so by angular, cherty gravel from the hills, which indeed is true of most of the soils of the county, though the limestone soils of the more open valleys are less so than others. The creek valleys, generally of the western portion of the county, are based on the same siliceous strata of the highlands, their lands being poor and thinly settled. The valleys of the southwestern portion, however, must be excepted. Here the strata are more elevated and the beds of the larger creeks, as that of Cane creek, in gray limestones, their valley areas often wide, well settled, and productive. The timber of the better valleys is poplar, beech, maple, ash, box-elder, white oak, walnut, butternut, red-bud, elm, ironwood, etc.

The crops of the county include, in addition to those given at the head of the description, peanuts, one of the chief crops, barley, buckwheat, cow-pease, sorghum, clover, and grasses. In 1869 the cotton product was 755 bales (400 pounds each), equal to about 636 475-pound bales of cotton, as against 1,302 bales (475 pounds each) in 1879, a marked increase. On the map of relative acreage planted in cotton in 1879 it is seen that in a central belt, lying on both sides of the Duck river, and widening toward the east, the percentage was the greatest, from 1 to 5; in belts outside of this, one on each side, from 0.1 to 1; while in the extreme northern and southern portions it was the least, less than 0.1.

<sup>a</sup> The Duck River valley is here indeed the beginning of the great Central Basin to the east, to which the blue limestone especially pertains.

## ABSTRACT FROM REPORT.

J. M. GRAHAM (lands of Piney and Duck rivers.—For kinds of soils, etc., see page 27).—On the first soil, bench or second bottom land, cotton grows from 3 to 5 feet, 3 feet being the best. Wet seasons, in July or August, incline the plant to run to weed, for which topping is the remedy. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,735 pounds making a bale of 475 pounds; staple middling. On land tilled ten years the product is 800 pounds per acre. The troublesome weeds are in the order named: Morning-glory, smart-weed, cocklebur, careless-weed, and lamb's-quarter; also crab-grass, rag-weed, and purslane. None of the land lies turned out. The slopes wash seriously, the valleys being injured thereby but little.

On the fresh hillside or uplands cotton grows to 18 inches. Seed-cotton product per acre on fresh land is from 750 to 800 pounds, 1,735 pounds making a 475-pound bale. On land tilled ten years the product is from 500 to 600 pounds. The weeds are crab-grass, rag-weed, and careless-weed. One-twentieth of the land lies turned out. Such land taken in again is generally much improved, depending upon the time it has been idle. The slopes wash seriously, the valleys being injured but little. Nothing is done to check damage.

On the land on the ridges cotton grows 10 and 18 inches high. The seed-cotton product per acre on fresh land is from 600 to 700 pounds, 1,735 pounds making a 475-pound bale; staple middling. On land tilled ten years the product is from 300 to 600 pounds. The weeds are crab-grass, foxtail, rag-weed, and purslane. One-twentieth of the land lies turned out, and if let alone for ten or fifteen years it is much improved. The slopes wash seriously, but the valleys are little injured. Cotton is shipped by wagon to Nashville or to Pinewood, where the Nashville price is paid for it.

## HUMPHREYS.

(See "Western valley of the Tennessee river".)

## GILES.

(See "Central Basin".)

## MAURY.

(See "Central Basin".)

## WILLIAMSON.

(See "Central Basin".)

## SUMNER.

(See "Central Basin".)

## DAVIDSON.

(See "Central Basin".)

Giles, Maury, Williamson, and Davidson counties have western portions, and Sumner a northern portion on the western subdivision of the Highland Rim, within the limits of which some cotton was raised. From the rim lands of Sumner, however, two bales only were reported.

## HIGHLAND RIM (EASTERN SUBDIVISION).

This subdivision embraces the greater parts of the counties of Franklin, Coffee, Warren, White, De Kalb, Putnam, Overton, Clay, and Macon, considerable parts of Jackson, Cannon,\* Moore,\* and Lincoln,\* and small parts of Bedford,\* Grundy, Van Buren, and Smith.\*

This entire subdivision must be referred to the "penumbral region" of cotton culture. As a cotton-producing district, however, it makes a better showing outside of the cotton belt proper than any other of equal extent in Tennessee. The counties embraced, with the cotton produced in 1879 and arranged in the order of greatest production, are as follows: Franklin, 171 bales; White, 139; Warren, 96; Overton, 41; Jackson, 28; Coffee, 20; De Kalb, 12; Putnam, 4; Macon, 1; and Clay 1. With these must be included the northwestern part of Van Buren and the southwestern part of Grundy counties, chiefly pertaining to the Cumberland table-land, but having the parts given resting upon the lower Highland Rim, where, substantially, all the cotton reported from the counties, 29 bales from Van Buren and 21 from Grundy, was raised.

On the map of relative acreage in cotton the cotton areas of the eastern subdivision (usually with less than one acre in a hundred in cotton) are well seen. With inconsiderable exceptions, all are upon the Highland Rim and in parts of counties lying along the western foot of the Cumberland table-land. (a) The largest area is in White, Van Buren, and Warren, the next in importance in Grundy and Franklin, and a third in Overton. The chief soil of the areas is the calcareous red clay of the Saint Louis limestone, brown when fresh, becoming red by cultivation, the soil mixing with the underlying red clay subsoils. (See Part I, under the Highland Rim.)

One county only of the subdivision is described. This may be taken as a type of the counties in the tier that includes the chief cotton areas, the tier extending in a direction east of north through the state, with its western part on the Highland Rim and its eastern on the more elevated table-land. For description of the area of non-cotton producing counties, see general regional descriptions.

a The small areas in Jackson, Putnam, and De Kalb are the exceptional ones. They are chiefly on the rim, miles away from the table-land, but in some parts (in Jackson especially) extend down into valleys referable to the Central Basin.

FRANKLIN.

*Population:* 17,178.—White, 13,646; colored, 3,532.

*Area:* 590 square miles.—Woodland, all.

*Tilled lands:* 92,753 acres.—Area planted in cotton, 414 acres; in corn, 41,560 acres; in wheat, 20,178 acres; in oats, 5,959 acres; in rye, 204 acres; in tobacco, 61 acres.

*Cotton production:* 171 bales; average cotton product per acre, 0.41 bale, 588 pounds seed-cotton, or 196 pounds cotton lint.

Franklin is the most southeasterly county of the Highland Rim. Its form is polygonal, approaching that of a semi-ellipse, with the base resting upon the Alabama line, and having a position east of the longitude of Nashville. The county is divided into two nearly equal parts: the northwestern, on the Highland Rim, with an average elevation not much if any less than 1,000 feet above the sea, and the eastern and southeastern, on the Cumberland table-land, 1,000 feet higher, or 2,000 feet above the sea. Neither part is unbroken. The Highland Rim west of the county-seat (Winchester) has the immediate valley of Elk river, 300 or 400 feet deep, eroded out of it, the latter supplying an area of rich blue limestone slopes and river lands like those of the great Central Basin. The area is indeed an inlet of the basin reaching eastward into the highlands. The table-land, on the other hand, is deeply cut in two in its eastern part by the narrow valley of Crow creek, a stream heading in the mountains and running southward to the Tennessee river. It is further cut along its Alabama margin by creeks rising within its limits and running into that state. There are also great openings within the area of the table-land, "inland coves" we may call them, such as Lost cove, Sinking cove, Round cove, and others.

The Highland Rim portion, making the great body of land in cultivation, includes a wide belt of strong red clayey lands, both level and undulating, extending northeastward and southwestward through the county parallel to the general direction of the Cumberland table-land. The belt spreads out laterally toward the table-land, and embraces the rich coves at its foot. Like the belt, too, in soils and rocks, are the valley of Crow creek and the lower parts of the "inland" coves of the mountain. On the northwest the belt gives place to the "barrens", with gray and thinner soils and a growth chiefly of half-size black and red oaks. The soil of the red lands, when fresh, is brown, with a red clay subsoil. The plow, however, after a few years' cultivation, mixes the two, and the red prevails. The underlying rocks are cherty limestones (Saint Louis), the liberated chert rendering the subsoils and soils gravelly with angular flinty or siliceous *débris*. Many streams traverse this portion of the county, their valleys contributing rich bottoms and arable slopes. Elk river flows for many miles over its rocks in the northern part of the county before descending into the "inlet" spoken of.

The lands of the table-land or mountain are based on sandstones and shales. They are thin and sandy, with an open growth of oaks, and have, with one noted and honorable exception, a scanty population, or none at all. The exception is that portion in the northeastern part of the county upon which the University of the South and its surroundings are located. The western, or rather northwestern, edge of the table-land is greatly indented with escalops and notches, and sheltered in these are the coves, some of large size, lying at its foot, the rich lands of the latter being greatly in contrast with the barren-like lands of the mountain. The edge of the mountain commands a most extensive view to the northwest. At the foot are the coves; beyond these, spreading out almost indefinitely, are the great plains of the Highland Rim, and in the dim distance, hardly discernible, the breaks marking the beginnings of the lowlands of the Central Basin. (For a notice of the steep slopes of the mountain, see page 35, under "The Cumberland table land".)

The native growth of the red lands, especially near creeks, and that of the coves and of the slopes of the table-land, includes many species, white and other oaks, poplar, black and white walnut, hickory, elm, linden, beech, ash, locust, etc. The timber is heaviest near the foot and on the slopes of the mountain. Away from the mountain and out of the valleys the growth is less heavy, black and red oaks abounding, with hickory and dogwood. Reaching the "barrens", black-jack, with its usual associates, appears. The chief crops are given above. Additional products are barley, buckwheat, potatoes, pease, and sorghum. Franklin in 1869 produced 289 bales of cotton (100 pounds each), and in 1879, 171 bales (475 pounds each), a falling off equal to 72 standard bales of 475 pounds each. The areas of the county in which the staple is cultivated, and also the relative acreage planted in each, may be seen on the map.

ABSTRACT FROM REPORT.

JOHN F. ANDERSON (southeastern corner of the county, Crow Creek valley.—For a notice of valley, kinds of soils, etc., see page 27). On the first soil, the alluvial, cotton plants grow from 3 to 6 feet in height, and are most productive at 4 feet. They incline to run to weed where left too thick and are not properly worked. The remedy is to top in August. The seed-cotton product per acre on fresh land is 1,500 pounds, 1,780 pounds making a 475-pound bale; staple good ordinary. After ten years' cultivation the product is 800 pounds, 1,545 pounds making a bale; staple low middling. The weeds are rag-weed, cocklebur, lamb's-quarter, and a little crab-grass. One-tenth of the land lies turned out, and if taken in again would produce as well as at first.

Of the yellowish and calcareous soil about one-fourth is planted in cotton. Plants grow to 3 and 4 feet, 3 feet being the best. The seed-cotton product per acre on fresh land is from 1,000 to 1,200 pounds, 1,660 pounds making a 475-pound bale; staple good ordinary. After eight years' cultivation the product is from 600 to 700 pounds per acre, 1,545 pounds making a bale; staple much better; the older the land the better the cotton. The weeds are Spanish needles, cocklebur, smart-weed, and dog-fennel. Very little of the land lies turned out, and produces about as well after a rest of a year or two. Very little washing occurs on slopes. No cotton is raised on the soil of the rocky mountain side.

Cotton is shipped to Nashville at \$1.40 per bale, or to Cincinnati.

CANNON.

(See "Central Basin".)

MOORE.

(See "Central Basin".)

## LINCOLN.

(See "Central Basin".)

## BEDFORD.

(See "Central Basin".)

## SMITH.

(See "Central Basin".)

## THE CENTRAL BASIN.

This embraces the whole or parts of the following counties: The greater part or all of Giles, Lincoln, Moore, Bedford, Marshall, Maury, Williamson, Rutherford, Davidson, Wilson, Sumner, Trousdale, and Smith; large parts of Cheatham,\* Jackson,\* and Cannon; and small parts of Macon,\* Putnam,\* De Kalb,\* and Coffee.\* The counties of the basin wholly within the cotton region proper are: Giles, Lincoln, Bedford, Marshall, Maury, Williamson, Rutherford, Davidson, Wilson, and Sumner. These are described below. Of the remaining counties, as named in Tables I and II, Moore reported, as the product of 1879, 7 bales; Cannon, 35; Smith, 0; and Trousdale, 1 (see also note at foot of page 11). The location of the cotton-producing section of the basin, with its areas of greatest and least production, may be seen to advantage on the map of relative acreage in cotton. This map may be compared with the diagram of the state on page 11. Lawrence and Lewis are entirely west of the basin. Much the greater part of Hickman is also, but the portion of the valley of Duck river in the eastern part of this county is properly referred, through its topography, rocks, and soils, to the basin. It is an inlet of the latter, reaching westward into the highlands. Not much, if any, less than two-thirds of the cotton product of Hickman must be accredited to the basin.

The Central Basin supplies, as stated on page 19, a subordinate center of cotton culture. In 1879 it produced 50,000 bales in round numbers, equal approximately to 15 per cent. of the entire yield of the state. The increased yield of the basin over that reported in the census of 1870 is, allowing for difference in weight of bales, 47 per cent.

## GILES.

*Population:* 36,014.—White, 21,824; colored, 14,190.

*Area:* 590 square miles.—Woodland, all.

*Tilled lands:* 170,599 acres.—Area planted in cotton, 31,416 acres; in corn, 67,758 acres; in wheat, 30,795 acres; in oats, 2,592 acres; in rye, 1,124 acres; in tobacco, 66 acres.

*Cotton production:* 13,802 bales; average cotton product per acre, 0.44 bale, 627 pounds seed-cotton, or 209 pounds cotton lint.

Giles takes the lead of the counties of the basin in cotton production. This county was originally nearly a rectangle in form, with its longer dimension extending north and south. In 1870 its northeastern corner was cut off to Marshall. It is one of the southern tier of counties, and rests upon the Alabama line in a position immediately west of the meridian of Nashville. Elk river and its tributary, Richland creek, are the chief streams. The first crosses the southeastern corner of the county, and the second, the most important, traverses much of the interior. Both have wide valleys with exceedingly fertile bottoms and slopes. Besides, there are numerous tributary creeks, all with bodies of choice lands. The county is made up of rich valleys and bold, though usually narrow ridges. The prominent ridges rise to the level of the Highland Rim surrounding the basin, and are capped off with its characteristic rocks. We may suppose indeed the flat highlands to have extended once unbroken over the whole area of the county, and that the waters, assisted by atmospheric agencies, have since scooped and worn out the valleys, leaving remnants of the highlands to stand as ridges.

With the exception of the western margin of the county, which rests mostly upon the Highland Rim, the area of Giles county is within the basin. It is one of the group of counties lying south of Elk ridge and spoken of on page 28, to which the reader is referred. The lands of the valleys and their slopes, excepting alluvial bottoms, are based on Silurian limestones, and mainly upon the Nashville series. (See page 30.) In some parts of the valley of Richland creek and its tributary, Big creek, the lowlands rest in places upon rocks of the Orthis bed, and even upon the Carter's Creek limestones. The limestone lands are everywhere naturally strong clay loams, mellow, often tempered with small cherty gravel, very fertile, and are found on second bottoms, moderate slopes, and steep declivities of the ridges. The lands of the ridge tops rest on siliceous or flinty and calcareo-siliceous rocks. Their soils are charged with flinty *débris*, and are but moderately fertile. A part of the gravel of the lower limestone lands comes from the ridge tops, though much is from the chert and siliceous fossils of the limestone in place. As to native growth, reference must be made to the abstracts of correspondents. The map of relative acreage in cotton will exhibit the belts of greatest and least production. On this the immediate valleys of Elk river and Richland creek hold the first place as cotton-producing areas. Cotton is shipped to Nashville by rail at \$1 75 per bale, or is sold at home.



ABSTRACTS FROM REPORTS.

D. T. REYNOLDS AND T. O. ABERNATHY (northern part of the county, waters of Richland creek).—The soils cultivated in cotton are: (1) Dark and brown loam of bottoms, with dark clay subsoils; (2) lighter loam, with reddish clay subsoils (uplands below flint lands); (3) gravelly or flint upland (near tops of ridges). The first, the loam of the second bottoms, is the chief soil, which forms about one-fourth of the lands, and occurs in a belt varying from 2 to 4 miles wide on either side of Richland creek, with a length of 30 miles. The chief timber is beech, elm, sugar-tree, black walnut, ash, and poplar. The soil is 10 inches thick, of a mahogany color, and rests upon a hard-pan or red clay and gravel mixed, all underlaid by rock at from 2 to 10 feet. The land is easily tilled in wet or dry seasons if not too wet in spring for preparation, and is best adapted to corn and cotton, the latter forming one-half of the crops. Cool weather in July inclines the plant to run to weed, the remedy for which is early and deep preparation and shallow cultivation. The seed-cotton product per acre on fresh land is from 1,200 to 1,750 pounds, 1,545 pounds (allowing 25 pounds for bagging and ties) making a 475-pound bale; staple rates as middling. On land cultivated for thirty years from 1,200 to 1,600 pounds of seed-cotton per acre were produced in 1879 on many farms, 100 pounds making from 29 to 31 pounds of lint; staple from one to two grades better than that from fresh land if the autumn was dry. The weeds are crab-grass and careless-weed. No land lies turned out. Slopes wash seriously if not well managed, the valleys being benefited thereby unless too much clay is washed down. Hillside ditching and level culture are done with good success.

The *upland soil* below the flint lands makes one-half of the lands. The growth is beech, poplar, oak, elm, and hickory. The soil, a clay mahogany loam, is from 4 to 10 inches thick. The subsoil, a tough reddish-yellow clay, is usually free from gravel, and is underlaid by limestone and sandy rock at from 4 to 6 feet. The land is easily tilled in wet and dry seasons, is early, warm, and well drained, and is best adapted to cotton, corn, and pease.

The *flint upland soil* makes about one-fourth of the lands, and is found on all the hills of the county. The growth is oak, hickory, elm, and walnut. The soil is a brown clay and gravel mixed, and is from 3 to 10 inches thick. The subsoil contains gravel, and is underlaid by limestone at from 4 to 10 feet. Land is easily tilled in all seasons, is early and warm, and is best adapted to corn, wheat, oats, and rye.

J. E. ABERNATHY AND SAMUEL YOKLEY (northwestern part of the county, waters of Big creek.—For kinds of soils, etc., see page 35).—On the second bottom mulatto soil cotton grows to 3 feet, and is best at that. The plant inclines to grow to weed on fresh soil after clover and after excessive rain in August. The remedies are cultivating thick in the drill, shallow plowing, and sometimes topping. The seed-cotton product per acre on fresh land is from 800 to 1,200 pounds, 1,545 pounds making a 475-pound bale, the staple rating low middling. On land cultivated ten years, rotating with corn and wheat, the product is from 600 to 800 pounds per acre, 1,660 pounds being needed for a bale, the staple being shorter. Weeds on fresh land are cocklebur and Spanish needles; afterward, careless-weed and lamb's-quarter. On the creek very little land lies turned out. Slopes wash only on badly managed farms. Horizontalizing and hillside ditching are done, with good success.

On the gravelly hillside soil cotton grows to 3 feet, and is best at that. Seed-cotton product per acre on fresh land is from 800 to 1,000 pounds. This land deteriorates by constant cultivation in cotton.

On the ridge land soil cotton grows to 2 feet. Seed-cotton product per acre on fresh land is 800 pounds, 1,545 pounds making a 475-pound bale. The staple is the best produced on our soils. The land does not bear continued cultivation in cotton.

JIM RIVERS AND NEWTON WHITE (waters of Richland creek).—There are some very coarse sandy lands on the high banks of Richland creek from 2 to 5 miles from its junction with Elk river. Such lands are not often seen in Tennessee. The lowlands are not as reliable as the uplands, but when the season suits they make more lint, but of poorer quality. Hillside exposed to the south are always best for cultivation, opening, and quality of lint, but require manure and rest. The soils cultivated in cotton are: (1) Coarse sandy, surest for a crop, and makes the best staple; (2) poplar soil, mulatto or brown, with yellowish-red subsoil; (3) bottom or black soil.

The *coarse sandy soil* forms a fourth or less of our lands, and extends from 1 mile north to 3 miles south in patches along the creek and river. The growth is poplar, beech, and hickory. Cotton forms two-thirds of the crops. The seed-cotton product per acre on fresh land is 1,000 pounds.

The *poplar or mulatto soil* comprises one-half the cotton lands, and is found generally over the county from the Alabama line northward in tracts of from 1,000 to 10,000 acres, nearly all of which is planted in cotton. The growth is poplar, beech, ash, some hickory, and elm. The seed-cotton product per acre on fresh land is from 700 to 1,200 pounds.

The *bottom or black soil* makes one-third of the lands planted in cotton, and is found all over the county in creek bottoms. The growth is sweet gum, beech, and elm. Cotton forms about one-half the crops. The seed-cotton product per acre on fresh land is from 200 to 1,500 pounds.

J. N. PATTESON AND W. RIVERS (waters of Richland creek and Elk river).—The uplands contain flinty gravel, are fertile, easily cultivated, endure drought, suffer less from wet weather, and are the most reliable farming lands in the county. The kinds of soils cultivated in cotton are: (1) Brown and mahogany clay loam or yellow poplar soil; (2) black soil on most of the small creeks of the county. The *brown and mahogany clay loam* forms three-fourths of the lands, and occurs throughout the eastern, over three-fourths of the southern, half of the northern, and one-third of the western portions of the county. The growth is black walnut, beech, yellow poplar, sugar-tree, hickory, linden, buckeye, and oaks. The subsoil is a tough clay that will hold moisture and retain manure. The land is well adapted to cotton, corn, wheat, potatoes, rye, sorghum, grasses, etc. About one-fourth of the land is planted in cotton. The seed-cotton product per acre on fresh land is from 1,000 to 1,600 pounds; on good land cultivated for twenty years with alternation of crops, from 800 to 1,200 pounds.

The *black soil* forms one-fourth of the lands. The growth is sweet gum, oak, box-elder, maple, etc. The land is best adapted to corn. About one-half of the crops is cotton. Seed-cotton product per acre on fresh land is from 1,200 to 1,600 pounds; after twenty years' cultivation, from 800 to 1,200 pounds.

J. J. LINDSAY (waters of Egnew's creek, west of Pulaski).—Our hill soils produce cotton about as well as the lowlands, stand long droughts better, and, owing to the gravel present, never bake. The soils cultivated in cotton are: (1) Brown, with very little gravel, or beech and poplar land, making about one-half the lands that occur along Egnew's and Richland creeks, about one-half of which is planted in cotton; (2) hill-land soil, dark, with flinty gravel, making nearly half the lands, about one-third of which is planted in cotton; and (3) clay ridge soil, worthless except for chestnut timber.

J. S. EDMONSON, J. F. PARKER, AND J. G. MASON (Civil District No. 2, Jenkins', Ford's, and Richland creeks, southwestern part of county).—The soils do not vary much from hill to hill, all being well adapted to cotton-growing. The growing season is too short to risk the first bottoms. The soils are: (1) Hill or upland on brooks or on the river, making 60 per cent. of the lands; (2) mahogany second bottom; (3) first bottom. The first is found 10 miles off in every direction. It rests upon a clayey subsoil, running down into coarse gravel and flinty masses, with limestone at from 3 to 15 feet.

## COTTON PRODUCTION IN TENNESSEE.

J. K. P. BLACKBURN (lands of Richland and Bradshaw creeks, eastern part of the county).—The uplands vary from rather elevated undulating table-lands to steep slopes and rugged hills. The soils cultivated in cotton are: (1) Brown or mahogany lands, lying well, with undulating surface, known to us as sand-rock land, which constitutes one-half of the lands, and occurs from 12 to 15 miles north, west, and south, and 6 miles east of this locality; is a quick, lively soil, from 3 to 12 inches thick, and has a subsoil of stiff, yellowish or reddish clay, getting harder on long cultivation, and underlain by limestone at from 1 foot to 10 feet, with one-third to one-half planted in cotton; (2) second bottom soil, occurring along Richland creek for 25 miles; (3) steep hillside and ridge top, from one-third to one-half of the lands. (Further details much as in other reports.)

T. B. WADE (lands of Pigeon Roost and Richland creeks, north of Pulaski).—Upland soils generally mixed with sharp, angular, flinty gravel. Some soils are free from gravel. Cotton is cultivated on southern hillsides, but will not mature on northern hillsides. On the black creek bottoms cotton is subject to rust, and the young fruit falls off. When the black soil is covered by a heavy deposit from a recent overflow of creek or river cotton grows well, and land subject to occasional overflow is the best for constant cultivation. The soils are: (1) Mahogany upland on southern slopes and in coves or valleys between the hills, making two-thirds of the lands, or the greater portion of uplands in the county, with nearly all that is suitable planted in cotton; (2) bottom soil above overflow, though bottoms with occasional overflows, as stated above, are better; (3) bottom with light deposit, the cotton on which is subject to rust. The general growth is beech and poplar on the hills and slopes, sugar-tree, elm, and some oak in the coves, and wild cherry, beech, walnut, and oaks in the bottoms. (Further details much the same as in reports.)

## LINCOLN.

*Population:* 26,960.—White, 20,643; colored, 6,317.

*Area:* 540 square miles.—Woodland, all.

*Tilled lands:* 146,326 acres.—Area planted in cotton, 8,868 acres; in corn, 57,460 acres; in wheat, 37,279 acres; in oats, 2,993 acres; in rye, 268 acres; in tobacco, 39 acres.

*Cotton production:* 3,486 bales; average cotton product per acre, 0.39 bale, 561 pounds seed-cotton, or 187 pounds cotton lint.

The area of Lincoln was once nearly square. The establishment in later years of two counties, Marshall and Moore, deprived it respectively of its northwestern and northeastern corners, so that its northern boundary is now approximately circular or rounded. The county has a wide base resting on the Alabama line. The meridian of Nashville cuts off a slice of the western portion, throwing the body of the county to the east of this line. A controlling topographical feature is the immediate valley of Elk river. This stream runs nearly west through the middle of the county, its valley dividing the latter into two portions nearly equal in area, but very unequal in population and agricultural importance. To the south lie elevated flatwoods "barrens", pertaining to the Highland Rim. North of the valley the whole country is made up of a multitude of long and rich creek valleys, with intervening ridges. In many parts of the county, especially northward, the ridges are numerous and bold, rising to the height of the Highland Rim, and showing its siliceous strata as capping rocks. Approaching the Elk river from the north, the ridges tend to run out, and the valleys widen, often unite, and finally open into the greater valley of the river. The ridges are spurs of Elk ridge, which for a short distance is a part of the northern boundary of the county, and make a portion of the sprays of ridges spoken of on page 28, under the Central Basin.

The lands of Lincoln of most interest are the alluvial bottoms of the river and creeks, the lands of second bottoms, moderate slopes, and steep ridge sides, all of which are based on the blue limestones of the Nashville series, and are remarkable for their fertility. (See part of report just cited.) These make up much the greater part of the northern portion of the county. The ridges have a gravelly, thinner soil, but a better one than that of the unbroken "barrens" south of the Elk River valley. Their growth includes great "poplars", chestnuts, oaks, and elms. The high "barrens" to the south have great extent. The soils are thin and the growth half-size oaks. Approaching the Alabama line, the lands improve, and areas of brown lands, with red subsoils, resting upon Saint Louis limestones, are met with. Creeks also occur with valley lands of better quality.

The distribution of the percentage belts of cotton culture and their relation to the Elk River valley are exhibited upon the map of relative acreage in cotton. This county lies at the eastern limit of the cotton-growing region proper.

## ABSTRACTS FROM REPORTS.

M. D. HAMPTON AND J. D. TILLMAN (lands of the Elk river).—The uplands are gravelly, with a dark yellow soil. Springs are sometimes too late, and frosts too early. The Elk River lands constitute two-thirds of all the lands cultivated in cotton. Their growth is oak, hickory, beech, poplar, gum, ash, etc. The soils are fine, sandy, and sometimes gravelly loam and heavy clay loam of gray, yellow, and blackish colors; the subsoil a reddish-yellow clay, mixed below with whitish gravel and pebbles, which becomes like the surface soil by cultivation, and is impervious when unbroken. Limestone rock occurs at from 10 to 30 feet. The land is easily tilled. The crops comprise all the grains and grasses, and some cotton. About one-half of the crops is cotton. Plants grow about waist-high in good seasons, but not so high in dry. The seed-cotton product per acre on fresh land is from 600 to 1,200 pounds, 1,660 pounds making a 475-pound bale; staple rates as middling. After a number of years' cultivation the product is from 400 to 800 pounds, 1,660 pounds making a bale, and the staple differing little. Crab-grass is troublesome. Very little land lies turned out and recuperates rapidly. Slopes do not wash seriously. Hillside ditching has been done with good success.

Cotton is shipped by rail to Nashville at \$2 per bale.

## BEDFORD.

*Population:* 26,025.—White, 18,536; colored, 7,489.

*Area:* 520 square miles.—Woodland, all.

*Tilled lands:* 164,800 acres.—Area planted in cotton, 2,239 acres; in corn, 68,492 acres; in wheat, 39,589 acres; in oats, 6,270 acres; in rye, 806 acres; in tobacco, 51 acres.

*Cotton production:* 940 bales; average cotton product per acre, 0.42 bale, 597 pounds seed-cotton, or 199 pounds cotton lint.

Bedford, nearly square in form, lies immediately south of Rutherford, the central county of Middle Tennessee, and is walled in on the east and south by the steep slopes of the Highland Rim and Elk ridge. Spurs from these

highlands encroach upon its area, but to no great extent, before breaking away into rolling lands or lines of hills between the streams. Hence the eastern and extreme southern portions of the county are undulating or hilly. They include, however, many beautiful and productive valleys and level areas.

West, northwest, and north from Shelbyville the surface is far less rolling, level or flat lands, indeed, predominating. This is the great cedar section of the county, and patches and belts of cedar glades are scattered all over it. It is, too, especially the more northwesterly part, the cotton section of the county. Cotton-growing lands, sometimes occurring in large bodies, alternate with cedar glades. Tracts are met with completely encircled by belts of these glades. The soil chiefly producing cotton is identical with the warm red soil of the cotton region of Rutherford county and rests upon the "central limestones", the lowest rocks geologically appearing at the surface within the basin. Above these, and resting upon them, often in low ridges, come the flaggy limestones of the cedar glades. These different limestones, with their soils and the character of the cedar glades, have been discussed on page 29 under the Central Basin.

All the Silurian limestones enumerated in the part of the report just referred to occur in Bedford, each supplying its characteristic lands and its characteristic topography. Leaving the checkered cedar and cotton section as a lower area, and proceeding backward either toward the eastern or southern boundaries of the county, we cross the successive belts of the outcropping limestones, ascending in the mean time until we land above the latter on the elevated and flinty lands of the Highland Rim or Elk ridge. The ascent is long, gradual, and irregular until the foot of the highlands is reached, when it becomes rapid. The whole, could we look from an elevated point in the northern section, would be a sort of grand topographical and agricultural amphitheater, but an exceedingly broken and interrupted one. These lands, though often very productive, are not cultivated in cotton to any noteworthy extent.

On the map of relative acreage in cotton it is seen that the northwestern corner only of Bedford lies within the cotton-producing region.

#### ABSTRACTS FROM REPORTS.

B. F. RANSOM, W. R. RANSOM, REV. M. F. THOMPSON, R. C. ALLISON, AND B. F. JARRELL (northwestern part of the county).—The chief soil is the dark red of the more elevated level land, making from one-half to two-thirds of the lands. The growth is black oak, dogwood, ash, walnut, hickory, and elm. The land is underlaid by limestone at from 2 to 6 feet, easily tilled in dry seasons, but is difficult when wet; it is early, warm, and well drained, and is well adapted to corn, wheat, oats, and clover. Not more than one-sixth of the crops is cotton. Plants grow to 4 feet, and are best at this height. They incline to run to weed when cultivated too loose in or near the drill, which can be remedied by running the mold-board of the Carey plow near the cotton. The seed-cotton product per acre on fresh land is from 700 to 1,000 pounds, about 1,660 pounds making a 475-pound bale; the staple rating well. After five years' cultivation the product is from 600 to 800 pounds per acre; staple not so good. The weeds are foxtail and crab-grass. Not more than 5 per cent. of the land lies turned out; but such land, if bushes are kept down and washes prevented, would produce well again. The soil washes on slopes; damage, 2 per cent. of value; valleys are not injured.

The dark creek loam makes about one-sixth of the lands in this section, and is best adapted to corn, wheat, and oats. Not more than 3 per cent. is planted in cotton in this section. The seed-cotton product per acre on fresh land is 800 pounds, 1,545 pounds making a bale. After twenty years' cultivation, if well managed, the product is as much as when fresh.

The red gravelly clay soil makes a tenth of the lands, and occurs in spots all over the region. The growth is poplar, ash, oak, etc. Very little land is planted in cotton. The seed-cotton product per acre is 400 to 500 pounds.

Cotton is shipped by rail and wagon to Nashville at from \$1 to \$2 per bale.

#### MARSHALL.

Population: 19,259.—White, 14,429; colored, 4,830.

Area: 350 square miles.—Woodland, all.

Tilled lands: 117,005 acres.—Area planted in cotton, 4,697 acres; in corn, 47,927 acres; in wheat, 30,484 acres; in oats, 4,675 acres; in rye, 392 acres; in tobacco, 47 acres.

Cotton production: 1,721 bales; average cotton product per acre, 0.37 bale, 522 pounds seed-cotton, or 174 pounds cotton lint.

Marshall is a hatchet-shaped county, with its broad edge turned southward and resting upon Giles and Lincoln. The meridian of Nashville passes lengthwise through the county, nearly bisecting its area. North of a line running east and west through Lewisburg, the county-seat, the county is level or moderately rolling. This part is a great checkered area, made so by alternating bodies of red cotton- and corn-producing land and cedar glades. The red lands (brown when fresh) are based on the "central limestones", and the glades, sometimes called significantly "cedar roughs," on the flaggy rocks of the "glade limestone". (See page 29, under the Central Basin.) It may aid in the understanding of this part of Marshall to assume the limestones of the red lands to be the floor or basis of the whole region, and that there have been squatted upon these at intervals belts and areas of cedar glades, from one mile to many square miles in extent, with their flaggy rocks and cedar timber. In harmony with this assumption, the belts and areas are often raised in low ridges and tables above the level of the red lands, like low islands above the sea. The aggregate areas of the red and cedar lands respectively are about equal. Chapel Hill is in a great body of the red lands noted for its beautifully lying and fertile farming tracts, and reaching from the northern boundary of the county across the Duck river to Farmington. The Spring Creek lands in the northeastern portion of the county are a part of this belt. Caney Spring and Verona are in another range. The greatest body of cedar land is in the northwestern corner of the county.

The southern portion of Marshall differs wholly from that north of Lewisburg. It is a great water-shed having Elk ridge, a backbone to the region, extending in an eastern and western course through its widest and middle part. The ridge is a bold summit which divides the waters of Duck river on the north from the waters of Richland creek on the south. It has numerous spurs. These are short on the north side, soon breaking up into foot-hills and productive rolling lands, with intervening fertile coves and valleys or broad level tracts. On the southern side the spurs are much longer, extending, where not cut off by coalescing valleys, far to the south. The valleys between them are mostly of unsurpassed fertility, and here and there open out into areas of the very best farming lands.

The soils of the valleys and slopes in the vicinity of Elk ridge, on both sides, are based on blue limestones of the Nashville series. They are brown and mulatto-colored, more or less gravelly, with heavy and varied native growth, warm, mellow, easily tilled, and suited to many crops. On the south side we have the head of the valley of Richland creek, so famous in Giles county as a productive area. Passing to the other side of the ridge, and proceeding northward toward the region of the cedar glades, belts of lands are successively crossed based on the sandy limestones of the Orthis bed and the pure lighter-colored ones of the Carter's creek group. Taking the whole county, it is seen that all of the subdivisions of the Silurian limestones outcrop within its limits and supply, ridge tops excepted, the aggregate of its soils. Elk ridge and its leading spurs mount to the level of the Highland Rim. The rocks of the crests are siliceous or flinty. The soils are gravelly, friable, of easy tillage, draining quickly, and moderately productive.

The growth of the county is heavy and rich, especially in the region of Elk ridge, including great oaks, poplar, elm, beech, sugar-tree, ash, linden, walnut, cherry, hackberry, locust, buckeye, and, on the ridges, chestnut. In addition, the glades supply the best of cedar timber. On the map of relative acreage in cotton the northern end and the southwestern corner of the county are seen to have had in 1879 the greater number of acres in cotton. The southeastern corner is the only part without the cotton-producing region. Cotton is shipped to Nashville by rail at \$1 50 or by wagon at \$2 per bale.

#### ABSTRACTS FROM REPORTS

J. B. EZELL (Spring Creek and Duck River lands, northeastern part of the county).—For soils cultivated in cotton, etc., see page 33).—Cotton grows from 2 to 4 feet high, 4 feet being the best. Continued wet weather inclines the plants to run to weed, for which the remedy is topping. Seed-cotton product per acre on fresh land is from 800 to 1,000 pounds, 1,660 pounds making a bale of 475 pounds, but the staple does not rate as high as old-land cotton. After two years' cultivation the product is 1,000 pounds, 1,600 pounds making a bale. Rag-weed is troublesome. One-fiftieth of the land lies turned out, and would produce well if taken in again. Slopes wash some, but not seriously.

J. F. BRITAIN (northeastern part of the county).—We select ground, old and new, having as much sand as possible. The chief soil makes up two-thirds of the lands, and extends off 25 miles in different directions. The growth is beech, poplar, and walnut. The chief crops are corn, cotton, wheat, and oats. The land is best adapted to corn and wheat. Cotton forms one-fourth of the crops. The remedy for running to weed is deep plowing near the stalk. The seed-cotton product per acre on fresh land is 800 pounds, 1,545 pounds making a 475-pound bale; staple rates as low middling. After six years' cultivation the product is 600 pounds, 1,485 or 1,545 pounds making a bale; seed lighter, with more lint than on new ground. Weeds are rag-weed, foxtail, and crab-grass. Very little land lies turned out, and would produce well if taken in again. Washing has been checked by sowing grasses, also by horizontalizing and hillside ditching, with good success.

W. B. GLENN (northeastern part of the county).—The lands are generally level for miles around, and the soil of the uplands is much alike. The chief soil cultivated in cotton is the richest upland, making about two-thirds of the lands. The growth is white and black oaks, ash, hickory, sugar-tree, dogwood, and some poplar. Cotton forms about 20 per cent. of the crops. Seed-cotton product per acre, in good seasons, on fresh land, is from 1,000 to 1,200 pounds, 1,660 pounds making a 475-pound bale; staple rates low middling.

#### MAURY.

*Population:* 39,904.—White, 21,731; colored, 18,173.

*Area:* 590 square miles.—Woodland, all.

*Tilled lands:* 216,066 acres.—Area planted in cotton, 21,748 acres; in corn, 85,496 acres; in wheat, 43,510 acres; in oats, 6,068 acres; in rye, 286 acres; in tobacco, 72 acres.

*Cotton production:* 8,912 bales; average cotton product per acre, 0.41 bale, 585 pounds seed-cotton, or 195 pounds cotton lint.

Maury ranks third among the counties of the basin in amount of cotton produced in 1879. Every civil district contributed to the aggregate. The county has a general pentagonal form, with its base resting upon Giles and Lawrence (mostly upon the former) and its center lying in a line running south-southwest from Nashville. The great cultivated area of the county, and the greater body of it, is walled in on the south, west, and northwest by a complete semicircle of bold highlands—Elk ridge on the south, and the edges and spurs of the Highland Rim on the west and northwest. Could one be sufficiently elevated above Columbia, the bold semicircle would come in view, sweeping more than half way round the horizon. To the west-northwest might be discovered a gap made for the egress of Duck river. To the west and southwest the eye, before reaching the distant ridges, would range over a wide, nearly level expanse of one of the grandest bodies of farming lands in the state. To the northwest the ridges would be nearer and more distinct, the cultivated lands being more encroached upon here by the highlands than elsewhere.

Turning about and directing the eye to the northeast, east, and southeast, the view changes. The ridges are absent, and the country becomes undulating or, in the distance, level to the very borders of the county.

The extreme eastern section of the county, in the region of Duck river, abounds in cedar glades, among which are limited areas of red lands, such as occur in Marshall and Rutherford. The rocks underlying the red lands are the "central limestones", the lowest geologically found in the basin. Then above these come the flaggy rocks of the cedar glades. Starting with this section of red lands and the more extensive glades as a central area, and proceeding radially over the county to the semicircle of highlands on the borders, belts of lands will be passed over corresponding to concentric outcrops of all the remaining subdivisions of Silurian limestones enumerated on page 29, under the Central Basin. Outside of the red lands and cedar glades is first a wide belt of the lands based on the Carter's Creek limestones. The belt extends to Columbia, and southward toward Culleoka. It supplies many good farming areas, and many upon which the thick-bedded and light-colored limestones crop out in blocks and ledges. Outside of this again come benches and tables of sandy lands, resting upon the sandy limestones of the Orthis bed. The latter graduate without any special line of demarkation into the highly fertile lands of the lower layers of the Nashville series. And here we find the broad expanses of undulating and level "poplar" lands, like those of the Polk and Frierson settlements and Big Bigby creek, which have given so much character to the

southwestern part of Maury as an agricultural region. North of Duck river and west of Columbia, and also in the southern part of the county, this belt is more rolling, often becoming hilly. Proceeding to the foot of the semicircle of highlands, the country becomes at all points broken and hilly, and valleys and coves, interlocked with ridges, especially on the northern side of Duck river, are met with, but all are based on the rocks of the Nashville series, and are rich nearly to the tops of the ridges. The ridges are capped with siliceous and flinty strata. Their soils are gravelly and mellow, though thin and but moderately productive.

I have said nothing of bottom lands. I can only add that Maury has a fair quota of these along Duck river and the numerous creeks, adding much to the agricultural capacity of the county.

The native growth and crops are given in the abstracts of correspondents. On the map of relative acreage in cotton the belt of greatest area planted in cotton runs through the middle of the county. It is chiefly located on the soils of the Nashville limestones. Cotton is hauled to Columbia in wagons at 50 cents per bale, or shipped to Nashville at \$1 per bale.

#### ABSTRACTS FROM REPORTS.

D. F. WATKINS AND L. E. POLK (Big Bigby lands, western and southwestern part of the county).—On new land cotton is liable to be too late unless the fall is very dry. Old lands are preferred. The soils cultivated in cotton are: (1) Yellow or poplar; (2) lowland, mostly black. The yellow or poplar is the chief soil, forming two-thirds of our lands, and extending from 5 to 15 miles in different directions. The growth is poplar, beech, oak, ash, walnut, sugar-tree, hickory, cherry, linden, with a dogwood and hornbeam undergrowth. The soil is a gravelly clay loam; the subsoil, a tough yellow clay, which bakes when exposed, but by cultivation becomes like the surface soil, and is underlaid by limestone at from 1 foot to 15 feet. Tillage is not troublesome in dry seasons, but rather difficult in wet. The chief crops are corn, cotton, and wheat, but the soil is best adapted to corn. About one-fourth of the crops is cotton. Plants grow to 3 and 6 feet, but are best at 3 feet, and incline to run to weed in wet seasons on rich, new (or bottom) lands, which is restrained by constant work to the last of July. The seed-cotton product per acre on fresh land is from 500 to 1,500 pounds, 1,780 pounds making a 475-pound bale; staple rates middling. The weeds are crab-grass, hog-weed, and purslane. No land lies turned out, but is generally seeded to wheat, oats, or barley, followed by clover, when it produces finely. The slopes do not wash seriously.

J. W. FRIERSON AND LEON FRIERSON (Big Bigby lands, southwestern part of the county).—For general statements, kinds of soils, etc., see page 35).—On the *mulatto or dark loam soils* cotton grows to 2 and 3 feet, 3 feet being the best. Some topping is done to restrain the plants. The seed-cotton product per acre on fresh land is from 1,000 to 1,500 pounds, 1,900 pounds making a 475-pound bale; staple rates low middling. After twenty years' cultivation the product is from 500 to 800 pounds per acre, according to the care taken of the land, 2,140 pounds making a bale. The weeds are careless-weed, smart-weed, cocklebur, and rag-weed. Very little land lies turned out; need never be turned out. Slopes wash on old thin lands. Horizontalizing and hillside ditching have been done, with indifferent success in most cases.

On the *black porous soil* the cotton raised is very productive at 4 feet, but the crop is uncertain. (Seed-cotton product and other details as under first soil.)

The *gravelly soil* occurs in a few spots, and has a growth of white and pin oaks and a few poplars. It is a gravelly yellow loam with a stiff clay. The subsoil is underlaid by gravel and limestone at from 3 to 6 feet. About one-fourth is planted in cotton. The seed-cotton product on fresh land is 1,000 pounds, 2,010 pounds making a bale; staple rates low middling. After twenty years' cultivation the product is from 300 to 500 pounds. (Other details as above.)

J. B. WILKES (Fountain Creek lands, southeastern corner of the county).—The lands vary; some yellow sandstone (Orthis bed) lands, some dark limestone. From 5 to 100 acres in places are tillable, and all are planted in cotton. The growth is poplar, oak, ash, beech, elm, sugar-tree, hickory, etc. The soils contain sometimes flinty gravel, are easily tilled in wet or dry seasons, and are early and warm when well drained. The chief crops are cotton, wheat, oats, barley, and corn, the soils being well adapted to all. Plants are restrained when necessary by topping. The seed-cotton product per acre on fresh land is from 800 to 1,200 pounds, 1,545 pounds making a 475-pound bale; staple rates low middling. Weeds are careless-weed and crab-grass. Very little land lies turned out. Such land, when taken in again, would produce well. Slopes wash seriously in some localities, but the valleys are not injured.

W. O. GORDON (lands of Carter's creek, north of Columbia).—On the *mulatto or poplar uplands* cotton grows to 3 feet. In warm, rainy seasons plants incline to run to weed, for which no remedy is used. The seed-cotton product per acre on fresh land is 800 pounds, 1,780 pounds making a 475-pound bale; staple rates good ordinary. After five years' cultivation the product is 600 pounds per acre, 1,760 pounds making a bale; staple then rates as low middling. The weeds are rag-weed, crab-grass, and foxtail. Ten per cent. of the land lies turned out. If taken in again it would require green fertilizers for its restoration. Slopes wash seriously, but the valleys are injured thereby to no great extent. Efforts are made to check the damage by horizontalizing, hillside ditching, and the use of wheat straw, and increased acreage of wheat is sown for this purpose.

On the *gravelly hill land* the growth is black gum, beech, hickory, elm, sugar-tree, walnut, and in some places black locust. Cotton grows to 3½ feet, and frequently remains green two or three weeks longer than that on the first soil. Seed-cotton product per acre on fresh land is 1,000 pounds, 1,800 pounds making a 475-pound bale; staple rates low middling. After five years' cultivation the product is 800 pounds.

On the *creek bottom soil* the growth is beech, oak, box-elder, hackberry, sycamore, and elm. It is a fine black loam, and is best adapted to corn and grasses. Cotton forms 10 per cent. of the crops. Plants grow to 3 feet, but get too weedy in wet seasons, for which no remedy is used. Seed-cotton product per acre on fresh land is rarely 1,200 pounds; the average is 500 pounds for all seasons, 1,840 pounds making a 475-pound bale. The weeds are morning-glory, smart-weed, rich-weed, and white-top.

#### WILLIAMSON.

*Population:* 28,313.—White, 15,922; colored, 12,391.

*Area:* 540 square miles.—Woodland, all.

*Tilled lands:* 158,970 acres.—Area planted in cotton, 11,859 acres; in corn, 61,122 acres; in wheat, 39,685 acres; in oats, 5,912 acres; in rye, 413 acres; in tobacco, 197 acres.

*Cotton production:* 4,538 bales; average cotton product per acre, 0.38 bale, 546 pounds seed-cotton, or 182 pounds cotton lint.

Among the counties of the basin Williamson ranked fourth in 1879 as a cotton-producing county. Its product was hardly a third of that of Giles. The county lies immediately west of Rutherford, the central county of Middle



Tennessee, and south of Davidson county. It has an ill-shaped area. If the northwestern corner were rounded off, its form would approach that of a semicircle, with its base tilted to the southeast, resting aslant against a sloping side of Maury.

The western end, including nearly or quite a third of the county, is on the Highland Rim, the remaining two-thirds being within the Central Basin. Although Williamson is among the richest counties of Middle Tennessee, and has many broad plateau belts and valleys of land inferior to none, yet it is, taken as a whole, a greatly broken county. Great ridges traverse many parts of it, and high hills are rarely out of view. Big Harpeth river is the trunk stream, into which all others, with inconsiderable exceptions, pour their waters. This river, rising just without the eastern boundary of Williamson county, enters the county near its southeastern corner and flows northwestward entirely through its area. Little Harpeth, in the northern part of the county, and West Harpeth, to the west of Franklin, the county-seat, the first flowing westerly and the second northerly, are important tributaries of the Big Harpeth. All these have unsurpassed farming lands along their courses and a great aggregate of them. The hills even bordering their valleys are rich to the tops. In the eastern part of the county the Big Harpeth has its bed chiefly in the Carter's Creek limestone, and at a few points in the lower glade limestone. With this exception the rocks of the Harpeth valleys belong to the Orthist bed and Nashville limestones, whose strata are so rich in all the elements that make a fertile soil. (See page 31, under the Central Basin.) On the same rocks rest the fine undulating lands south of Franklin, and indeed most of the best lands of the county.

In the eastern part of Williamson, over a considerable area, as at Triune, the Orthist bed has an unusual development. Its sandy layers (so-called sandstones) and shales are greatly thickened, and make the underlying rocks of table-areas upon which cotton is cultivated. The sandy, mellow, and poplar lands of these rocks make much of the upland country from Nolensville to Triune and southward to the beautiful valley of Grove creek. They occur in sections between the creeks, the immediate valleys of the latter usually cutting down to the heavy-bedded, light-colored limestones of the Carter's creek subdivision.

In the eastern end of the fourteenth district, about half way between Triune and Franklin, and touched on the south by Big Harpeth river, is a spot of cedar glades two miles or more across. It has all the characteristics—flaggy limestones, cedar timber, and black and reddish-yellow soils—of a Rutherford county glade. (a) In describing the lands of Williamson we might have begun with this spot as a geological and agricultural center and proceeded outward, for its rocks belong to the lowest subdivision outcropping in the county. First, without completely surrounding the cedar center and making much of the territory of the fourteenth district and of contiguous parts of districts to the south, is an irregular belt of country resting upon the Carter's Creek limestones, containing many upland areas of fair land, but much interspersed with tracts spotted and slopes terraced with naked rocks. Outside of this again come the sandy benches of the Orthist bed, the lands of which, often thin at first, run back, especially to the north, west, and southwest, and blend with those of the Nashville series, giving the grand bodies of farming lands, valley plateau, and hill lands we have already noticed, the aggregate of which is equal to half the county. To these again in the west (west of West Harpeth) succeed the lands of the elevated Highland Rim, with its great expanse of "barren" flatwoods cut into sections by mountain streams, some of which, like South Harpeth, have narrow and rugged but very rich valleys.

The growth and crops of the county are given in the abstracts of correspondents. On the map of relative acreage in cotton the belt of greatest percentage is a continuation of that in Maury, the whole belt lying mostly on the lands of the Orthist bed and the Nashville limestones. Cotton is shipped, by rail or wagons, to Nashville at from 75 cents to \$1 per bale.

#### ABSTRACTS FROM REPORTS.

SAMUEL PERKINS (lands of Nelson's, Wilson's, and Arrington's creeks, eastern part of the county).—These lands alternate with ridges of light loam and dark limestone land. The particular lands of this region are considered unusually well adapted to cotton, and have a well-drained and warm soil. The lighter sandy loam produces a taller stalk, matures early, and is less inclined to blight. High on the hills the surface is covered with yellowish sandstone, blocks detached from a stratum underneath the soils. On hills higher than the sandstones blue limestones are seen, and on slopes below it are lighter colored limestones.

The soils cultivated in cotton are: (1) Brown light loam inclined to be sandy, with a yellow or red clay subsoil, mixed with sandy gravel and underlaid usually with sandstone at from 6 to 10 feet; (2) dark or black limestone, containing flinty gravel, and a subsoil of stiff yellow clay. The chief soil is the brown loam, making not quite half the lands. The ridges of this soil extend eastward 2 miles, ending in a limestone ridge. The growth is white and yellow poplar, black gum, ash, dogwood, white and red elm, white and black walnut, white and red oaks. The land is easily tilled in wet or dry seasons. Cotton grows to 2 and 4 feet; best at 2½ and 3 feet. Seed-cotton product per acre on fresh land is from 800 to 1,200 pounds; on land cultivated twenty years, if rolling, or slopes, and neglected, from 250 to 500 pounds, or if well cultivated from 500 to 1,000 pounds. Very little land lies turned out.

The dark limestone soil makes about 60 per cent. of the lands, and occurs generally throughout the county. The growth is sugar-tree, white ash, box-elder, black walnut, red elm, and red oak. The seed-cotton product per acre on fresh land is from 600 to 1,000 pounds.

J. S. CLAYBROOKE, H. B. HYDE, AND W. L. JOHNSON (lands of Wilson's creek and Harpeth river).—Uplands are quick, especially the black, flinty, rolling lands, and bolls mature early. The bottoms are generally narrow, and cotton on them grows too much to stalk and is liable to be killed by frost. When, however, the frost is late and the fall is warm and dry the bottoms will yield nearly a bale to the acre. The soils cultivated in cotton are: (1) Black gravelly upland, limestone land; (2) sandy upland, sandstone and limestone land, with poplar as the prevailing growth; (3) black bottoms, on which cotton does not open. (Details much as in preceding abstract.)

T. F. P. ALLISON (lands of Grove creek, southeastern part of the county).—There are many kinds of soils in this district. The flinty gravel and yellow sandstone soils are the best both for cotton and wheat; the black loam is best for corn. These make about 80 per cent. of the lands. The growth generally is beech, elm, sugar-tree, poplar, white oak, walnut, and, on the high ridges, chestnut. The chief crops are wheat and corn. The soil is adapted to a variety of crops. One-sixth of the crops is cotton. The seed-cotton product per acre on fresh land is 1,800 pounds, 1,780 pounds making a 475-pound bale. The staple on old land is the best. One-tenth of the land lies turned out. If taken in again and broken in the fall, and rebroken in the spring, it would produce good corn, but not cotton the first year.

a A spot of cedar timber and glade limestone occurs in the extreme eastern angle of the county as we enter Rutherford, and another about Nolensville, on Mill creek, in the northwestern corner of the county.



S. A. POINTER (lands of Aenon and Harpeth creeks and of Duck and Big Harpeth rivers, southern part of the county.—For remarks and kinds of soils, see page 34).—On the mulatto poplar soil cotton grows from knee to shoulder high; waist high is the best. To prevent plants from going to weed, wet and roll the seed in plaster, plant early, and top the stalks in August. The seed-cotton product per acre on fresh land is from 700 to 1,500 pounds, 1,660 pounds making a 475-pound bale; staple rates middling. After fifteen years' cultivation the product is 500 pounds per acre, and even lower; yet if not plowed too wet it is injured less than any other crop; have known it planted in the same field for forty years. Staple on old land is somewhat shorter, but the yield is about the same. Foxtail and crab-grass are the most troublesome weeds. Little or no land lies turned out. Land that has been lying out, if not too badly washed, produces finely. Land lying out washes badly, and valleys are injured very little, if at all. Hillside ditches are often cut, with good success.

The light sandy soil lasts but a few years, even where cultivated carefully. Very little cotton is planted. Seed-cotton product per acre on fresh land is from 500 to 800 pounds, 1,660 pounds making a 475-pound bale; staple rates low middling. After fifteen years it would not sprout pease, and is too poor to grow weeds. Grasses alone are troublesome.

BROADWELL BROTHERS (northeast of Franklin).—The mulatto or poplar soil is the one almost universal here, and has a growth of poplar, black walnut, sugar-maple, and beech, with an undergrowth of papaw. The soil is a light gravel-clay loam of a mahogany color from 6 to 12 inches thick. The subsoil, a gravelly clay, becomes loose when exposed to the air and frost, and is underlaid by limestone at from 2 to 20 feet. The crops are cotton, corn, and wheat. The soil is best adapted to the last two. Cotton forms one-sixth of the crops. Plants grow to 3 feet; best at that. Topping is used to restrain the plants if need be, but is of no benefit unless followed by dry weather. The seed-cotton product per acre on fresh land is from 1,200 to 1,500 pounds, 1,840 or 1,900 pounds making a 475-pound bale; staple rates middling. After thirteen years' cultivation the product is 600 pounds per acre, 1,840 pounds making a bale; staple is shorter and finer, but thicker on the seed, and the seed lighter. Very little land lies turned out, and if taken in again would produce well. Slopes wash to some extent. A little horizontalizing and hillside ditching is done, with good success.

### RUTHERFORD.

*Population:* 36,741.—White, 20,248; colored, 16,493.

*Area:* 590 square miles.—Woodland, all.

*Tilled lands:* 200,049 acres.—Area planted in cotton, 32,657 acres; in corn, 75,753 acres; in wheat, 29,250 acres; in oats, 6,482 acres; in rye, 483 acres; in tobacco, 47 acres.

*Cotton production:* 12,414 bales; average cotton product per acre, 0.38 bale, 543 pounds seed-cotton, or 181 pounds cotton lint.

Rutherford, one of the counties of the basin, stands second only to Giles in the number of bales produced in 1879. It is first in number of acres planted in cotton; a fact which, taken in connection with the above statement, is more to the credit of Giles than of Rutherford. Both in these respects are much ahead of any other in the basin, only one county indeed, Maury, making a distant approximation to them. The county would be roughly square in form and with the cardinal points if the sharp northwestern corner were cut off to the north. It is the central county of Middle Tennessee, and indeed of the state. The central part of the basin lies within its area a few miles to the west of Murfreesborough.

The agricultural areas of Rutherford are arranged quite symmetrically. We have first a large level or undulating area of red cotton lands, elliptical in form, lying centrally and diagonally within the county. The town of Smyrna is near its northern end, Murfreesborough a few miles east of its center, and Christiana (points on the Nashville and Chattanooga railroad) at the southern end. The area along its principal axis is 24 miles in length and 12 in width, and is equal in square miles to a third of the county. The soil, when fresh, is a brown-clay loam, becoming red after several years' cultivation, owing to an admixture of the red clay subsoil. It is mellowed by flinty grains and gravel from the chert of the underlying rocks. The latter are called the "central limestones", and are the lowest rocks exposed in the basin. (See page 29, under the Central Basin.) The native growth of these lands, which we may call "central lands", is a species of hickory, large red and white oaks, common locust, honey-locust, black walnut, cherry, post oak, sugar-tree, poplar, box-elder, mulberry, and hackberry, with dogwood, red-bud, hornbeam, and cane.

Then, secondly, around the central area is a remarkable belt of cedar glades, inclosing it (quoting from a previous page) as a frame its picture. (a) These glades are in the aggregate equal to another third of the surface of the county. They often rise in low ridges above the central lands. The rocks which make them are known as glade limestones. The glades have little value outside of the great cedar timber they supply. (See page 29.)

The glade belt extends out to the northern boundary of the county, and even beyond it into Wilson. It also reaches the western boundary at certain points. In all other directions, after passing the glade area, we intersect within the county the lands of a second great belt or ring, that based on the Carter's Creek limestones. This belt is complete in itself, but the northern portion is thrown into Wilson county, and much of its western portion into Davidson and Williamson by the extension of the glades in those directions. The lands, though in the main of second class, supply, when lying well, very desirable farming regions and cotton soils. They are, however, often hilly and rough from outcropping rocks. In Part I of the report (place referred to above) they are more fully described.

The lands of the second belt constitute most of the county remaining outside of the cedars. In the southeastern corner, however, there succeed bodies of the mulatto lands of the Orthis and Nashville limestones. This part is rolling, at points hilly, and includes several large ridges. Within the area of the second belt, at different points in the county, isolated hills or groups of hills, like Versailles knob, in the southwestern part of the county, rise up, whose slopes show Orthis and Nashville rocks and their characteristic soils. Finally, beyond all, a section of the eastern boundary a little north of the southeastern corner rests upon the high edge of the Highland Rim.

On the map of acreage the central lands are prominent as to percentage of land in cotton. Table I shows a great increase in the product of 1879 over that of 1869. Allowing for difference in weight of bales, the increase is 76 per cent.

Cotton is shipped, by rail or wagon, to Nashville at from 50 cents to \$1 50 per bale.

a A little north of Florence station a low ridge of cedars extends across the central lands, cutting off really the northern end. This is not regarded in the general account above.

## ABSTRACTS FROM REPORTS.

C. F. VANDERFORD, W. N. MASON, J. S. GOOCH, AND DR. R. B. HARRIS (lands of Overall's and Stewart's creek and east and west forks of Stone's river, northwestern part of the county).—The uplands of these streams are our best. Cotton lands do not vary much, as the country is generally level. The soils cultivated in cotton are: (1) Yellow (red) loam, with stiff clay subsoil; (2) yellow gravelly soil, with the same subsoil; (3) black coarse soil, not often used. The first, the yellow (or red) loam, makes more than half the lands. The subsoil contains flinty gravel, underlaid first by gravel and then by limestone at from 3 to 10 feet. Land is not easily tilled in wet weather; more easily in dry. The chief crops are cotton, corn, and wheat; also sorghum-cane, oats, and potatoes to a limited extent. One-fourth of the farming land is put in cotton. Plants grow to a height of 3 feet; this is the best. Wet weather inclines the plants to run to weed, which is restrained sometimes by reducing the ridge. Seed-cotton product per acre on fresh land is from 800 to 1,000 pounds, 1,660 pounds making a 475-pound bale; staple rates low middling. After twenty years' cultivation the product is from 600 to 800 pounds, 1,780 pounds then making a bale; staple rates inferior. The weeds are crab-grass and foxtail. None of the land lies turned out, but is put in clover. Slopes wash, but are easily checked. In a few instances horizontalizing has been done, with good success.

The yellow gravelly soil makes one-fourth of the lands. One-fourth of this soil is planted in cotton. Plants average 2 feet. The seed-cotton product per acre on fresh land is from 400 to 600 pounds, 1,425 pounds making a 475-pound bale; staple rates low middling. After fifteen years' cultivation the product is from 200 to 300 pounds. Crab-grass is troublesome. One-half or more of the land is in clover.

The black coarse soil comprises about a fourth of the lands, and is mostly cultivated in corn.

J. W. SMITH, DR. J. W. DAVIS, ROBERT BRUCE, W. S. BATTEN, D. M. NELSON, AND A. H. SANDERS (land of Stewart's creek and Stone's river).—For remarks, kinds of soils, etc., see page 33).—On the brown upland soil with red clay subsoil cotton grows from 2 to 4 feet high; best at 3 feet. A wet autumn, after a dry summer and deep cultivation, incline the plant to run to weed, for which shallow plowing is the remedy. The seed-cotton product per acre on fresh land is from 800 to 1,200 pounds, 1,660 pounds making a 475-pound bale; staple rates well. After twenty years' cultivation the product is from 600 to 800 pounds; staple compares well with that of fresh land. The weeds are crab-grass and morning-glory. About one-fifteenth of the land lies turned out; taken in again it would produce well if not washed. Slopes wash seriously in some places, but can be restored; valleys are sometimes injured, but to no great extent. Horizontalizing and throwing brush in the gullies have been practiced with benefit. The second soil does not differ enough from the first to make a description necessary. There is very little of the third soil.

A. M. McELROY (county generally).—In 1867-'68 I was the cotton weigher for Rutherford county. The crop of 1867 was the largest ever made in the county. My books show that I weighed for that year over 20,000 bales. The cotton lands lie on the water-courses, the three prongs of Stone's river being the principal ones. The soils cultivated in cotton are: (1) Dark mulatto, one-tenth of the land in cultivation, from 6 to 10 inches thick, with a subsoil of yellow clay; (2) lighter yellow—more of this than of any other kind; (3) red, like the second in productive capacity.

## DAVIDSON.

Population: 79,026.—White, 47,678; colored, 31,348.

Area: 500 square miles.—Woodland, all.

Tilled lands: 139,166 acres.—Area planted in cotton, 3,224 acres; in corn, 52,764 acres; in wheat, 18,651 acres; in oats, 8,141 acres; in rye, 379 acres; in tobacco, 41 acres.

Cotton production: 1,333 bales; average cotton product per acre, 0.41 bale, 588 pounds seed-cotton, or 196 pounds cotton lint.

Davidson claims distinction inasmuch as the capital stands within its area. The county is pyramidal in shape, with a concave base, and it may be compared to a military cap seen in profile, with its sharp southwestern corner as the visor. The Cumberland river, with a general course to the west-southwest, winds through its area in a remarkably serpentine manner, the huge folds inclosing alternately on the two sides large and rich bodies of land. Such are Jones', Neely's, McSpadden's, Cockrill's, White's, and Bell's bends, the first being the most easterly and the last the most westerly. The surface of the county is in general rolling, with many rich valleys and plateau areas. Some parts are hilly; others almost mountainous, with high ridges.

The greater part of the county is within the area of the basin. The western part, equal to one-third or more of the whole, is properly on or within the range of the Highland Rim. We may, indeed, refer all of the county west of the valleys of White's creek, on the north side of the Cumberland river, and Richland creek on the south side, to the rim. But this great belt is not a continuous flat highland. Its southern part is intersected by the valleys of the Cumberland, Harpeth, and West Harpeth rivers, and is otherwise badly cut up by the valleys of creeks. North of the valley of the Cumberland the high belt is little dissected, and presents here a large block of flatwoods and rolling highlands, with the characteristic half-size oak growth and thin soils. Many spurs start out eastward from the highlands and interlock with scores of exceedingly fertile valleys. These, with but few exceptions, soon break down into lines of rich hills and then into level or rolling uplands. One of the exceptions is the prominent ridge dividing the waters of the Cumberland and Harpeth rivers.

Reaching in a direction nearly north and south through the middle of the county, between the valleys of White's and Richland creeks on the west and the Louisville and Nashville and the Nashville and Decatur railroads on the east, is a central belt of the county, averaging 5 or 6 miles in width, that is unsurpassed in fertility, and is the pride of the county. The land has the characteristic mulatto soil of the Nashville limestone, with a varied, heavy native growth. (See page 32, under the Central Basin.) But little cotton is raised upon it.

The part of the county east of the railroads mentioned, and extending to within a few miles of the Rutherford line and a corner of Wilson county, may be regarded, in general, as a wide-spreading table upland area with mellow, warm, and early lands based on sandy limestones. It is on this upland that most of the cotton of the county is raised. Within it are Jones' bend, the Hermitage, and the uplands along the Murfreesborough and Nolensville turnpikes. The rocks determining its table topography and giving character to it as an agricultural region are in the main the sandy strata of the Orthis bed. (See page 31.) Here and there swells and hills rise up above the plateau and locally contribute rocks and soils of the overlying Nashville series. The great table is cut into sections by the valleys of the Cumberland and Stone's river and Mill creek, and their most important tributaries. These streams have cut through the capping sandy rocks and made their beds in the light-colored and heavy-bedded

limestones of the Carter's creek subdivision. This conformation and arrangement of formations and surface, so different from that west of Nashville, is made possible by the gradual rising of the strata as we go eastward. Westward the Orthid bed sinks below the river.

In the extreme eastern part of the county, contiguous to the Rutherford line and a corner of Wilson, the part excepted above, the sandy lands grow thin and break away, giving place to those of the Carter's Creek limestones, which become predominant. At a few points the county even touches the great cedar-glade belt of Rutherford.

A reference to the map of relative acreage will show that part of Davidson in which cotton is cultivated. The northeastern part is the area of greatest production. The product of 1879 was but little greater, 12 per cent., than that reported for 1869. In 1879 the product of Davidson was only one-twelfth of that of Rutherford.

Cotton is shipped to Nashville at 50 cents per bale.

#### ABSTRACTS FROM REPORTS.

W. WEAVER, W. A. DONELSON, AND J. M. TURNER (lands of Cumberland river, northeastern part of the county).—The soils cultivated in cotton are: (1) Brown clay loam; (2) light sandy loam; (3) black loam with little sand. The *brown clay loam* forms one-half of the lands, and has a growth of oak, hickory, ash, walnut, beech, hackberry, maple, elm, and gum. Subsoil, clayey and gravelly, which turns to a top soil when thrown up, produces a growth of weeds the first year and makes fine summer turnips, and is underlain by limestone at from 1 foot to 10 feet. The soil is early and warm, and is best adapted to grain. Cotton forms one-fifth of the crops, and grows to a height of 3½ feet. New or strong land and wet weather cause overgrowth. The seed-cotton product per acre on fresh land is 1,200 pounds, 1,520 pounds making a 475-pound bale; staple not so good as on old land. After thirty-nine years' cultivation the product is 800 pounds per acre; if the land does not wash, it ought to improve; 1,520 pounds make a bale; staple finer but shorter. Weeds are morning-glory, cocklebur, and rag-weed. One-tenth of the land lies turned out, and is generally worn to the rocks; if not, it could soon be revived by clover. Slopes wash seriously. We try to prevent it by horizontalizing, with moderate success. The *light sandy soil* forms one-fourth of our lands, extending half a mile in each direction. The growth is small swamp oak, holly, and beech. The soil is late and cold. One-third of the crops is cotton. The seed-cotton product per acre is one-half bale. The black limestone land is unfit for anything.

W. S. DONELSON (Hermitage, Cumberland River lands, northeastern part of the county).—The soils cultivated in cotton are the red clay and black limestone, forming three-fourths of the lands. One-tenth of the crops is cotton. The seed-cotton product per acre on fresh land is from 800 to 1,200 pounds, 1,660 pounds making a 475-pound bale; staple rates low middling. After twenty years' cultivation the product is from 300 to 500 pounds per acre; staple is better. The weeds are careless-weed and crab-grass.

PHILIP EARHEART (Stoner's Creek lands, northeastern part of the county).—The soils cultivated in cotton are: (1) Black sandy; (2) flat lowland, partly overflowed; (3) light yellow sandy, ridge land. The *black sandy upland* is the best, and forms half the lands. Its growth is poplar, ash, oak, hickory, dogwood, elm, and papaw. One-third of the crops is cotton. The seed-cotton product per acre on fresh lands is from 1,000 to 1,200 pounds.

The *flat lowland* soil occurs up and down Stone's river and Stoner's creek. Its growth is overcup oak, hackberry, box-elder, sugar-tree, maple, willow, cottonwood, some hickory, and ash. Very little cotton is planted.

The *light sandy* soil forms one-fourth of the lands, and is productive, especially for cotton. Its growth is white and black oaks, some poplar, persimmon, dogwood, black haw, hickory, and ash. One-fourth of the crops is cotton. The seed-cotton product per acre on fresh land is from 500 to 600 pounds.

M. M. LEEK (Mill Creek lands, east of Nashville).—Our lands produce corn, wheat, clover, and some cotton, and are adapted to almost any crop. The seed-cotton product per acre on fresh land is from 800 to 1,000 pounds, 1,545 to 1,780 pounds making a 475-pound bale; staple rates low middling. After five years' cultivation the product is from 600 to 800 pounds per acre; staple is good ordinary. Crab-grass is troublesome.

B. GRAY (Hurricane creek, southeastern corner of the county).—For kinds of soils cultivated in cotton, etc., see page 34).—On the red clay soil cotton grows to a height of from 1 foot to 4 feet; best at from 2½ to 3 feet. Wet seasons or very rich land incline cotton to run to weed; topping is the only remedy used, and this is a doubtful one. The seed-cotton product per acre on fresh land, if the season is suitable, is 1,000 pounds, 1,545 pounds making a bale of 475 pounds. After ten years' cultivation the product is from 500 to 800 pounds per acre. Foxtail and crab-grass are most troublesome. Very little land lies turned out. The second soil is the black loam land. (Details much the same as above.)

#### WILSON.

*Population*: 28,747.—White, 20,292; colored, 8,455.

*Area*: 410 square miles.—Woodland, all.

*Tilled lands*: 170,229 acres.—Area planted in cotton, 3,191 acres; in corn, 68,468 acres; in wheat, 32,983 acres; in oats, 9,978 acres; in rye, 852 acres; in tobacco, 361 acres.

*Cotton production*: 1,272 bales; average cotton product per acre, 0.40 bale, 567 pounds seed-cotton, or 189 pounds cotton lint.

Wilson lies north of Rutherford and west of Davidson county. Its northern boundary is for the most part the Cumberland river, and the county would be nearly rhombic in shape were not the southwestern corner cut largely away to Rutherford. The surface of the county is greatly varied. Alluvial lands occur at intervals along the streams, and rolling lands alternate with plateau areas and benches or great cedar glades. Some parts are hilly, and high, bold ridges are met with in the eastern and southeastern parts of the county.

The cedar glades are a marked feature in this county, as in Rutherford, Bedford, and Marshall. They are based on thin, flaggy limestones, cover many square miles, and have supplied a vast amount of superior cedar logs and timber. A great belt of glades, 10 miles or more across, comes out of Rutherford and extends, though with contracting width, northward through the central part of Wilson to Lebanon, the county-seat. Glades of limited extent, alternating with other areas, occur north and northwest and also east from Lebanon, and in the cedar regions patches of arable lands, with black and brown soils, are met with. The latter, with gravelly yellowish or reddish-yellow subsoils, are the most important, and are sometimes cultivated in cotton, especially in the southern part of the county. (a) The flaggy limestones of the cedars belong to the subdivision of the Silurian limestones I have denominated "glade limestones". (See page 30, under the Central Basin.)

a Occasionally spots of the red lands of the Central limestones, so extensively developed in Rutherford, are discovered. Their aggregate area, however, is very limited.

Next outside of the glades we have everywhere lands in valleys, belts, or sections of greater or less size, based on the heavy-bedded and light bluish-gray limestone, named "Carter's Creek limestone". (See page 30.) There is much of this in the angle of the county to the southwest of Lebanon, and many wide desirable valleys to the northwest of the same place, all within the cotton-producing portion of the county. The same lands occur in valleys to the north, east, and southeast from Lebanon; in fact, summarily, pretty well over the county. The alluvial and second bottom or gently sloping lands of these valleys, taken together, give to the county many superb farms noted for strength of soil and productiveness.

Again, in most of the county, highlands occur between the valley areas. These are often mere dividing ridges or lines of hills. In many portions, however, they are flat-topped ridges or plateau areas of greater or less extent. Their soils are sandy, and rest upon the sandy limestones (blending upward sometimes with the bottom layers of the Nashville limestones) belonging to the subdivision named on page 31 the "Orthis bed". The Lebanon and Nashville turnpike crosses such ranges, as at Silver Springs and Greenhill, and just without the county in Davidson, at the Hermitage. Others occur north and south of this line. They are known as poplar or hickory ridges, and they supply in this part of the county favorite cotton-growing tracts. (a) In the eastern part of the county they are also present. In this direction, however, many of the high ridges rise above the "Orthis bed" and contribute to the agricultural wealth of the county rich slopes of the mulatto lands characteristic of the Nashville limestones.

On the map of relative acreage in cotton it is seen that the cotton-producing portion of Wilson lies chiefly in the southwestern and western portion of the county; and further, that this portion is for the most part the northern end of the cotton-growing region of Middle Tennessee. Cotton is shipped to Nashville at from \$1 to \$1.50 per bale.

#### ABSTRACTS FROM REPORTS.

E. H. THORNTON (southwestern part of the county.—For remarks and kinds of soils cultivated in cotton, see page 33).—On the soils named cotton grows from 1 foot to 4 feet high, 3 feet being the best. Wet weather in August inclines the plant to run to weed, for which topping is the remedy. The seed-cotton product per acre on fresh land is 600 pounds, 1,660 pounds making a 475-pound bale; staple is coarse. After four years' cultivation the product is from 200 to 400 pounds, 1,545 pounds making a bale; staple is shorter but finer, and seed lighter. Crab-grass is troublesome. But little land lies turned out. Slopes wash seriously, but the valleys are not injured thereby until the soil on the uplands is exhausted. Horizontalizing has been tried with good success.

W. C. DAVIS AND TURNER VAUGHAN (lands of Spencer's creek and Cumberland river, northwestern part of the county).—The Cumberland River uplands cannot properly be considered hilly until we get east of the cotton region of this section. The soils cultivated in cotton are: (1) Brown poplar ridge, lying mostly on slopes; (2) red or limestone, mostly on level or gradually sloping plains; (3) yellow or red sandstone land. The chief soil, "poplar" ridge, makes about one-fifth of the lands, and occurs to the east, south, southeast, and southwest for 15 miles, but is largely broken up by other varieties. Its growth is poplar, walnut, dogwood, mulberry, oak, etc. Tillage is easy in wet or dry seasons, and the soil is early, warm, and well drained. The chief crops are corn, cotton, oats, wheat, and clover; but one-twentieth of the land is planted in cotton. Plants grow to a height of from 1½ to 2 feet. Excessive rain and thick planting may cause them to run to weed, but this may be restrained by early planting. The seed-cotton product per acre on fresh land is 1,000 pounds, 1,600 pounds making a 475-pound bale; staple rates good ordinary. After ten years' cultivation the product is 750 pounds, 1,660 pounds making a bale; staple not so good or fine. The weeds are smart-weed and crow-foot grass. Very little land lies turned out; if taken in again it would produce finely, and is easily restored, only requiring time. Steep slopes alone wash; valleys are injured more or less in proportion to the clay washed down. Little is done properly to check damage.

The red or limestone soil is perhaps not more than one-twentieth of the lands of this region. It occurs to the east, 10 miles; south and southeast, 20; southwest, 12. Any crop does well on this. (Other details as above.)

The yellow or red soil of sandstone land forms not more than one-fiftieth of our lands. One-twentieth of this land is planted in cotton. Under no circumstances does cotton incline to run to weed. (Details as under first soil.)

#### SUMNER.

Population: 23,625.—White, 16,294; colored, 7,331.

Area: 530 square miles.—Woodland, all.

Tilled lands: 139,980 acres.—Area planted in cotton, 732 acres; in corn, 49,245 acres; in wheat, 20,445 acres; in oats, 9,188 acres; in rye, 779 acres; in tobacco, 495 acres.

Cotton production: 317 bales; average cotton product per acre, 0.43 bale, 618 pounds seed-cotton, or 206 pounds cotton lint.

Sumner lies north of Wilson and Davidson counties, between the Cumberland river and the Kentucky line. Its area has nearly the form of a square, excepting that the southwestern corner protrudes to the west and the southeastern is encroached upon by Trousdale. The topography of the county is simple and its belts of land compact and easily comprehended. The northern portion of the county is on the Highland Rim, and the southern portion within the basin, the area being about equally divided between the two. The northern half is therefore elevated. Its lands, between the shallow valleys of the streams, are flat and "barren", the timber small oaks and hickories, with chestnut, and the soils are thin and poor. Toward Kentucky the lands improve as the red soils of the Saint Louis limestones are approached.

South of the edge of the highland, or of "the ridge", as they call it in Sumner, to within a mile of the river, is a belt of mulatto lands averaging 5 miles or thereabout in width and extending eastward and westward through the county, the like of which is to be seen only in the grand belt, of which it is a part, lying along the foot and in front of the edge of the Highland Rim in Williamson and Maury counties. On the north side the lands of this belt are made hilly or rolling by spurs jutting out from the highland. Going toward the river, the county becomes less rolling, and often spreads out into the most beautiful farming tracts. These lands are based on Nashville limestones and rocks of the "Orthis bed". Nearest the river the sandy lands of the latter rocks generally predominate, and it was on these, in the southwestern corner of the county, that most of the cotton accredited to Sumner was raised.

a Often on the steeper slopes, where these lands break away as we pass to those of the Carter's Creek limestones below, the soil is very thin and poor, frequently presenting bare or "scalded" places along the hillsides.

Within a mile of the Cumberland, more or less, the lands we have noticed break away and give place to the immediate valley of the river. This valley supplies another but narrow and often rough belt of lands based chiefly on the Carter's Creek limestones. At a few points the sandy lands of the "Orthis bed" sink down to the level of the river. Rich alluvial bottoms occur at intervals along the river, and a fair proportion of them along the creeks of the county.

On the map of relative percentage the location of the cotton-producing lands is seen. It is a small area, and is at the extreme northern end of the cotton region of Middle Tennessee. Cotton is hauled to Nashville at 50 cents per bale.

ABSTRACTS FROM REPORTS.

J. G. MARTIN AND S. R. DOXEY (lands of Drake's creek and Cumberland river, southwestern part of the county).—On the yellow poplar soil cotton grows to a height of 3 or 4 feet, and at this height is most productive. In wet seasons plants incline to grow to weed, for which we know no remedy. Cotton is not planted on fresh land. After five or six years' cultivation the seed-cotton product per acre is from 1,000 to 1,200 pounds with good attention, from 1,660 to 1,780 pounds making a 475-pound bale; staple very fine. Crab-grass and foxtail alone are troublesome. No land lies turned out, but is sometimes clovered and grassed and then put in cotton. There is very little washing on slopes. Nothing of consequence is done to check it.

The second soil, dark loam or blue-grass soil, forms about half of our lands, and occurs for 5 or 10 miles in small and large farms. Growth, walnut, ash, oak, locust, and the like. The soil is a brown clay loam with a deep yellow clay subsoil; thickness, 6 to 8 inches. The subsoil is friable when exposed, becoming like the surface soil, and is underlaid by clay and rock at from 1 foot to 4 feet. The land is easily tilled, though not so easily as the first soil; is later than the first, and is well drained naturally. The soil is best adapted to blue grass and other grasses, corn, potatoes, and then cotton. Very little is planted in cotton. Plants grow to 18 and 30 inches, the last the best. Fresh land is not put in cotton. After five or six years the product per acre is from 800 to 1,000 pounds, 1,660 to 1,780 pounds making 475-pound bale. Grasses alone are troublesome. None of the land lies turned out, but all is planted in grass or clover. Very little washing occurs on slopes, and scarcely anything is done to check it.

HARRY SMITH AND J. G. MARTIN (lands of Drake's creek and Cumberland river).—There are a number of farms in this immediate vicinity having a red or yellow sandy soil adapted to cotton. Cotton is more successfully raised here than elsewhere in the county, due to a greater proportion of sand in the soil. The soils are: (1) Red or yellow sandy upland, either on level land or slopes; (2) brown-loam or blue-grass soil, suited to corn and grain; (3) black buckshot, very sleek in wet weather. The chief soil for cotton is the red or yellow sandy, making three-fourths of the land in this vicinity, and extending a mile and a half north, 3 miles east and west, and bounded on the south by the Cumberland river. Its growth is poplar, ash, oak, elm, walnut, some beech, dogwood, ironwood, etc. The soil is a fine sandy loam 6 inches thick. The subsoil is a yellow clay, which crumbles in the sun, but is almost impervious when undisturbed, and is underlaid by limestone at from 5 to 20 feet. The land is early and well drained. Cotton is the money crop, and the soil is best adapted to the staple. One-third of the crops is cotton. Plants grow to 2½ and 3 feet. Soil too rich or containing too much calcareous matter inclines the plants to run to weed, which some restrain by topping; but my plan is to use the hoe. The seed-cotton product per acre on fresh land is from 500 to 1,500 pounds, 1,780 to 1,900 pounds making a 475-pound bale; staple is best from old land. After forty years' cultivation the product on the farm I work is from 500 to 1,000 pounds, the same quantity making a bale. Crab-grass is very troublesome from the middle of June until fall. Very little land lies turned out. Cotton cultivation does not exhaust the land, excepting on slopes which wash. Slopes wash seriously in some places, but the valleys are rather improved thereby. Horizontalizing has been done with very good success.

CHEATHAM.

(See "Highland Rim, western subdivision".)

JACKSON.

(See "Highland Rim, eastern subdivision".)

MACON.

(See "Highland Rim, eastern subdivision".)

PUTNAM.

(See "Highland Rim, eastern subdivision".)

DE KALB.

(See "Highland Rim, eastern subdivision".)

COFFEE.

(See "Highland Rim, eastern subdivision".)

## THE CUMBERLAND TABLE-LAND, THE VALLEY OF EAST TENNESSEE, AND THE UNAKA MOUNTAIN REGION.

These regions respectively embrace the following counties:

TABLE-LAND.—Fentress, Scott, Morgan, Cumberland, Van Buren, and Grundy.

TABLE-LAND AND VALLEY.—Marion, Sequatchie, Bledsoe, Hamilton, Rhea, Anderson, Campbell, and Claiborne.

VALLEY.—James, Bradley, McMinn, Meigs, Loudon, Roane, Knox, Jefferson, Union, Grainger, Hamblen, Hancock, Hawkins, Washington, and Sullivan.

VALLEY AND UNAKA.—Polk, Monroe, Blount, Sevier, Cocke, Greene, Unicoi, Carter, and Johnson.

The leading topographical and agricultural features of these great natural divisions of the state have been given in Part I of this report. They lie within the penumbral region of cotton culture; or, strictly, the valley of East Tennessee is a "penumbral region", while the other two, the Cumberland table-land and the Unaka Mountain region, both mountainous divisions, lay so feeble a claim to the designation that we may throw them out as non-producing areas. Their relations to cotton production are sufficiently given in the respective accounts given of them in Part I.

In the valley of East Tennessee, though the division has no county in which cotton can be considered as one of the chief crops, there are many isolated areas, especially in the southern and middle portions of the valley, in which from 1 bale to 70 bales were produced. One county, indeed (Hamilton), reports the respectable number of 143 bales. The distribution of these areas is best learned by a reference to the map of relative acreage. The entire constellation of colored spots and patches seen on this map, and lying east of the counties of Franklin, Grundy, Bledsoe, Cumberland, Morgan, and Fentress, is within the valley. The colored area in Marion is in Sequatchie valley, but Sequatchie belongs properly to the great valley. In Table I the product of the several counties from Marion, producing 35 bales, to Johnson, producing nothing, is given, and need not be repeated here. (a) The total production of the entire valley was in 1879 only 537 bales, an aggregate product less than that of the limited cotton-producing corner of Sumner county within the basin.

The soils of the valley have been noticed in the description of the division in Part I of the report. In many sections they would produce cotton well if the growing season were long enough to be relied upon. The cotton actually produced was cultivated upon a variety of them; but the yield, in the aggregate, was so small, and the areas concerned so scattered, that even if we had the proper data but little practically would come from a discussion of the relations. It will be observed upon the map that there is a general increase in cotton culture as we approach Georgia and Alabama. The valley is indeed "penumbral" to areas of higher percentage production in these states. An examination of Table I brings out the fact (allowing for errors in the column of cotton bales for 1870) that there was comparatively a great increase in the product of 1879 over that of 1869.

### ABSTRACTS FROM REPORTS.

HAMILTON COUNTY, *J. M. Ellis*: The first and second bottoms and uplands of Chickamauga creek are considered. Cotton-growing, tried here for five years, seems satisfactory on the first and second soils. On low, rich bottoms there is too much weed, and bolls do not open. The soils used for cotton are: (1) Red soil, lying high and fair to the sun; (2) cherty gray soil, lying high; (3) bottom lands, not often planted in cotton. The chief soil is the *dark red soil*, and about half of our land consists of this kind. The growth includes oak, hickory, poplar, and ash. The soil is about 12 inches thick, but often less, and is underlaid by gravel and limestone (dolomite) at from 1 foot to 10 feet. The chief crops are corn, oats, clover, red-top, and wheat, all of which, excepting wheat, do well. About two acres in a hundred are planted in cotton, the plants attaining a height of 2½ feet. Wet weather and deep plowing promote the growth of weeds, which is restrained by shallow plowing and the free use of some good fertilizer. The yield of seed-cotton on fresh land is from 600 to 800 pounds per acre, of which it requires 1,485 pounds for a 475-pound bale, the staple rating as good ordinary. On land that has been in cultivation the product is from 400 to 600 pounds, requiring the same number of pounds as on fresh land for a bale, the staple comparing favorably with that of the first soil. Rag-weed and crab-grass are most troublesome. The second soil, the *gray cherty*, forms a fourth of the lands. Its growth is oak and hickory principally. It is a sandy, gravelly, grayish loam, sometimes black, 2 or 3 inches thick, underlaid by limestone (dolomite) at from 1 foot to 5 feet. It is tilled more easily in wet seasons than in dry. The subsoil is heavy, with angular gravel. The soil is best adapted to corn and clover, but about 2 per cent. of it is planted in cotton, which grows 2½ feet high. The seed-cotton yield is from 400 to 600 pounds per acre, requiring the same as that on the first soil for a bale, the staple rating as low middling. After two years' cultivation the land produces from 600 to 800 pounds per acre, the staple being the same. The weeds are rag-weed and crab-grass. About 5 per cent. or less now lies turned out. Such land tends to wash, and hence does not do so well when again cultivated. No efforts have been made to prevent washing.

JAMES COUNTY, *J. A. Green*: The first and second bottoms and uplands of Ooltewah creek and of the Tennessee river are referred to. The climate here is too cold and generally too wet for cotton. It does well occasionally on the mulatto uplands when the fall is dry. The soils cultivated in cotton are: (1) The mulatto uplands; (2) gray sandy land, or black gravelly upland; (3) black land. The first kind makes the largest proportion of the lands. Its growth is hickory, oak, and poplar, with occasionally pine forests. The chief crops produced are corn, wheat, oats, potatoes, and vegetables. Not more than one-twentieth is put in cotton. About 1,425 pounds of seed-cotton are required for a 475-pound bale, the staple rating as fair in the market. The most troublesome weeds are rag-weed, cockleburrs, and Spanish needles.

POLK COUNTY, *Erly Boyd*: Cotton has but recently been cultivated in this county, but to no great extent. It is planted in the light sandy bottoms of the Hiwassee and Oconee rivers and in lands of Conasauga creek. The lands are best adapted to corn. Cotton grows from 2 to 4 feet in height. From 1,000 to 1,200 pounds of seed-cotton are produced per acre, of which from 1,600 to 1,900 pounds are required for a 475-pound bale. The staple rates as good. The troublesome weeds are rag-weed, crab-grass, and morning-glory.

a In the study of this table, and also of Table II, the general heading must not mislead. So far as cotton is concerned, all reported from Marion, inclusive, to the end pertains, as stated substantially above, to the valley of East Tennessee.



---

PART III.

---

CULTURAL AND ECONOMIC DETAILS  
OF  
COTTON PRODUCTION.

---

# REFERENCE TABLE

OF

## REPORTS RECEIVED FROM TENNESSEE COUNTIES.

### ALLUVIAL PLAIN OF THE MISSISSIPPI RIVER.

(Received during 1880.)

*Lake*.—(1) W. H. ANDERSON, Tiptonville, July 10; refers to county generally. (2) C. M. PEACOCK, Tiptonville, June 28; civil district No. 4, on eastern side of county. (3) D. WAGONER, Tiptonville, May 31; county generally. (4) R. S. BRADFORD, Tiptonville, May 15; county generally. (5) L. DONALDSON, Tiptonville, July 21; Mississippi alluvium, margin of Reelfoot lake. (6) J. W. FOWLER, Tenbrook, July 1; civil district No. 3. (7) R. M. DARNALL, Marr's Landing, April 2; civil district No. 1, northwestern part of county.

*Dyer and Lauderdale*.—(8) C. H. PATE, Cottonwood Point, Missouri, July; alluvial and cultivated belt along the Mississippi.

### ALLUVIAL PLAIN OF THE MISSISSIPPI RIVER AND PLATEAU SLOPE OF WEST TENNESSEE.

*Lauderdale*.—(9) JOE L. LEA, Fulton, May 3; civil district No. 4, southwestern corner of county; Mississippi and Hatchie alluvium; Hatchie second bottoms; uplands of Tipton and Cane creeks and of the Hatchie. (10) I. A. LACKEY, Ripley, April 21; Cane creek and river lands. (11) J. F. YOUNG, Double Bridges, April 22; county generally. (12) J. J. ALSTON, Glimpville, June 1; southern part of county. (13) P. T. GLASS, Ripley, April 9; civil district No. 1, southeastern part of county; Hatchie lands and Mississippi alluvium.

### PLATEAU SLOPE OF WEST TENNESSEE.

*Lauderdale*.—(14) R. L. HALLIBURTON AND J. C. MARLEY, Ripley, April 1; civil district No. 2, eastern part of county. (15) E. R. OLDHAM, Ripley, May 1; civil district No. 2, eastern part of county; lands of Cane creek. (16) F. T. RICE, Durhamville, April 1, southeastern part of county; waters of Hatchie river. (17) J. H. FLOWERS, Henning, July 12; civil district No. 3, southeastern part of county. (18) W. W. HURT, Double Bridges, August 1; northeastern part of county.

*Dyer*.—(19) D. C. CHURCHMAN, Newbern, June 19; civil district No. 6, northeastern part of county. (20) SMITH PARKS, Newbern, April 3; northeastern part of county. (21) L. M. WILLIAMS, Newbern, March 25; northeastern part of county, between the Obion and Forked Deer rivers. (22) A. HARRIS, Newbern, January 3; northeastern part of county.

*Tipton*.—(23) Dr. W. H. HILL, Covington, April 19; civil district No. 1, northern part of county. (24) J. U. GREEN, Covington, April 14; civil district No. 1, northern part of county. (25) S. P. DRIVER, Covington, June 26; civil district No. 1, northern part of county. (26) Dr. T. W. ROANE, Covington, April 30; lands of Beaver Dam creek and of Big Hatchie. (27) J. H. SHINAULT, Mason, April 12; civil districts Nos. 8 and 9, southern part of county. (28) A. W. SMITH, Brighton, April 22; central and northwestern parts of county, Indian creek lands.

*Shelby*.—(29) Dr. W. D. TUCKER, Lucy, April 17; civil district No. 3, northern part of county; Big creek lands. (30) H. L. DOUGLASS, Woodstock, April 26; northwestern part of county, lands of Big creek and Loosahatchee. (31) Dr. S. HAMMONTREE, Woodstock, April 1; civil district No. 4, lands of Big creek. (32) JAMES STEWART, Memphis, March; county generally. (33) W. H. NELSON, White Haven, April 16; part of county south of Memphis, Nonconnah and Hurricane lands and Mississippi alluvium.

*Obion*.—(34) J. H. McDOWELL, Union City, May 1; civil districts Nos. 10 and 13, north of Troy; Hoosier creek lands. (35) B. W. HERRING, Union City, July 1; uplands, western part of county. (36) J. S. MURPHY, Harris Station, April 17; northeastern part of county, between Obion river and Harris' Fork.

*Fayette*.—(37) J. B. THORNTON and A. L. PEARSON, Rossville, June 25; civil district No. 10, southwest corner of county and northeast part of district. (38) A. D. LEWIS, La Grange, March 25; southeastern part of county, Wolf river lands. (39) J. M. GALLAWAY, Gallaway, January 2.

*Hardeman*.—(40) WILLIAM RUSH, Pine Top, April 15; a part of county northeast from Bolivar, Piney creek lands. (41) E. E. LOW, Saulsbury, April; civil district No. 1, southwestern corner of county; Spring creek lands. (42) J. A. MANSON, Saulsbury, March 31; civil districts Nos. 1 and 10, southwestern corner of county. (43) O. B. POLK, Hickory Valley, April 30; civil districts Nos. 2 and 3, western part of county. (44) H. M. POLK, Bolivar, March 29; lowlands and uplands of Spring creek and Hatchie river.

*Haywood*.—(45) AARON WALKER, Brownsville, April 15; county generally. (46) F. A. LORD, Brownsville, March 1; civil district No. 7, center of county. (47) J. W. KERR, Brownsville, May 27; civil district No. 9, western part of county. (48) H. WILLIAMS, Brownsville, May 1; northwest part of county. (49) J. B. BRANTLY, Wellwood, April 10; civil districts Nos. 4 and 5, eastern part of county. (50) H. M. CLARKE, Wellwood, April 5; eastern part of county, between Forked Deer and Hatchie rivers. (51) Dr. H. C. ANDERSON, Carolina, March 29; western and northwestern parts of county. (52) J. M. SHAW, Brownsville, and Professor J. NELSON, Dancyville, April 15; civil district No. 4, eastern part of county.

- Madison*.—(53) D. R. ALLISON, Stephenson, June 30; eastern part of county. (54) J. D. PEARSON, Clay Brook, June 28; civil district No. 12, northeastern part of county. (55) S. M. OSIER, Pinson, May 1; southeastern part of county. (56) THOMAS INGRAM, Andrew Chapel, May 1; civil district No. 7, western part of county; Panther creek and Forked Deer lands. (57) E. C. HARBERT, Andrew Chapel, July 9; lands of Cypress and Johnson's creeks, western part of county. (58) J. Y. KEITH, Jackson, April 28; lands of Johnson's creek and Forked Deer river, western part of county. (59) J. J. BOON, Jackson, April 21; civil district No. 8, southwest of Jackson; Hopper's creek and Forked Deer lands. (60) T. C. LONG, Jackson, April 10; western part of county, Johnson's creek lands. (61) A. D. HURT, Jackson, July 1; western part of county, Johnson's and Cub creek lands. (62) M. V. B. EXUM, Carroll, June; northwestern part of county, Cane and Dyer Creek lands. (63) M. P. COLLINS, Carroll, April 3; civil district No. 11, northeast from Jackson. (64) G. C. BUTLER, Medon, June 25; southern part of county, Clover creek lands.
- Crockett*.—(65) T. J. WOOD, Bell's Depot, November 19; county generally. (66) E. J. READ, sr., Bell's Depot, March 22; lowlands of Black creek; uplands generally. (67) P. M. NEAL, Maury City, July 10; civil district No. 10, western part of county.
- Gibson*.—(68) J. M. SENTER, Trenton, July 15; county generally. (69) J. W. HAYS, Trenton, June 24; Cane creek lands, south of Trenton. (70) L. P. McMURRY, Trenton, July; southwestern part of county, Big creek and Forked Deer lands. (71) ZACK BRYANT, sr., Milan, April 3; southeastern part of county, waters of the Obion and Forked Deer rivers.
- Weakley*.—(72) E. D. TANSIL, Sharon, May 1; southwestern part of county, lands of Mud creek and Obion river. (73) A. M. SMYTH, Gleason, April 20; southern part of county, lands of Spring creek and Obion river. (74) G. W. ISBELL, Gardner's Station, April 24; northwest from Dresden. (75) S. C. CRAVENS, Gardner's Station, April 22; northwest from Dresden. (76) J. C. LIPSCOMB, Greenfield, April 17; southwestern part of county, lands of the three forks of the Obion river. (77) GILBERT PATTERSON, Greenfield, July; southwestern part of county. (78) T. D. MARTIN, Martin, April 3; northwest from Dresden.
- Henry*.—(79) W. P. SMALLWOOD, Paris, July 5; county generally. (80) S. C. DOBBINS, Paris, April 19; south and southwest parts of county. (81) J. F. CAVITT, Paris, January 2; northwestern and southwestern parts of county, waters of the forks of the Obion river. (82) B. D. BOWDEN, Cottage Grove, July 23; county generally. (83) J. R. WILLIAMS, Henry Station, April 22; county generally. (84) Dr. W. S. FRYER, Paris, July 3; county generally. (85) A. ROBINS, Manlyville, April 26; waters of Gin branch and Big Sandy river, southeast from Paris. (86) D. L. WILLETT, Springville, July 15; civil districts Nos. 7 and 24, southeastern part of county.
- Carroll*.—(87) E. T. BOHANNON, Trezevant, April 20; western part of county, waters of Lick creek and Obion river. (88) B. T. HILSMAN, Trezevant, April 20; western part of county, waters of Reedy creek and Obion river. (89) A. R. CARNS, Carnsville, July; northern part of county, waters of Crooked creek. (90) T. N. LANKFORD, McKenzie, April 1; northwestern part of county, Obion uplands. (91) J. F. SLOAN, Milan, Gibson county, August 4; northwestern part of county, Obion lands. (92) J. H. JORDAN, Hollow Rock, June 18; northeastern part of county, lands of Hollow Rock creek. (93) WILLIAM JOHNSON, Clarksburg, July 1; southeastern part of county, Roane's creek and Big Sandy lands.
- Henderson*.—(94) W. C. TRICE, Henderson, Madison county, April 8; southwestern part of county, uplands of Forked Deer river. (95) E. W. CUNNINGHAM, Lexington, March 1; county generally. (96) JOHN PEARSON, Lexington, June 3; eastern part of county, Beech river lands. (97) N. C. ESSARY, Lone Elm, July; county generally. (98) C. M. DAVIS, Lone Elm, June 22; eastern part of county, Beech river lands. (99) T. M. STUBBLEFIELD, Shady Hill, July 10; southeast from Lexington. (100) R. J. DYER, Shady Hill, April 1; civil district No. 14, southeast from Lexington. (101) F. G. ROGERS, Scott's Hill, April 20; southeast corner of county, lands of Cane and Flat creeks and Beech river. (102) A. H. FARNSWORTH, Centre Point, May 1; civil districts Nos. 12 and 13, southeastern part of county. (103) P. B. McNATT, Centre Point, March 4; southeastern part of county, Middleton creek lands.
- McNairy*.—(104) B. M. TILLMAN, Henderson, Madison county, January 8; civil districts Nos. 4 and 14, northwestern part of county. (105) A. W. STOVALL, Bethel Springs, June 29; county generally, waters of the Hatchie and Tennessee rivers. (106) J. H. ROWSEY, McNairy Station, July; northwest from Purdy, waters of the Hatchie. (107) R. D. ANDERSON, Falcon, April 10; southwest from Purdy, Oxford's creek, waters of the Hatchie river. (108) SYDNEY PLUNK, Tinsley, and F. E. MILLER, Sweet Lips, April 13; northern part of county, waters of the Forked Deer. (109) J. G. COMBS, Purdy, April 15; parts of districts Nos. 15, 7, 10, and 11, east of Purdy. (110) J. H. MEEKS, Stantonville, April 9; civil districts Nos. 5, 9, and 10, southeastern part of county; also much of eastern part. (111) W. J. SUTTON, Corinth, Mississippi, April 15; southeastern part of county, Owl creek lands.

## WESTERN VALLEY OF THE TENNESSEE RIVER.

- Benton*.—(112) A. C. PRESSON, Camden, July; county generally. (113) P. M. MELTON, Big Sandy, April 9; northern part of county. (114) J. H. BRIDGES, Camden, April 5; middle of county, Cypress creek, waters of the Tennessee. (115) A. E. SWINDLE, Camden, March 20; lands on Tennessee river side. (116) W. F. MAIDEN, Camden, April 15; lands on Tennessee river side.
- Decatur*.—(117) J. H. PEABOY, Decaturville, June 20; lands of Turkey creek, west of Decaturville. (118) D. M. SCOTT, Decaturville, April 16; middle and southern parts of county. (119) JOHN McMILLAN, Decaturville, January 22; county generally. (120) R. T. SIMMONS, Swallow Bluff, June 24; southern part of county. (121) W. R. and R. J. AKIN, Swallow Bluff, April 20; southern part of county, Stewman's creek lands. (122) J. G. YARBOROUGH, Peter's Landing, Perry county, July 6; civil district No. 2, southeastern part of county, along the Tennessee. (123) W. H. BOGGAN, Bath Springs, June 23; southern part of county, Turnbow's creek lands. (124) J. F. AKIN, Bath Springs, April 20; southern part of county, Turnbow's creek lands. (125) L. D. CRAWLEY, Peter's Landing, Perry county, April 7; south of Decaturville, White's creek lands.
- Hardin*.—(126) J. C. MITCHELL, Saltilló, June 10; northwestern part of county. (127) J. W. IRWIN, Savannah, June 25; civil district No. 4, central part of county.
- Hamphreys*.—(128) W. J. WHITE, Fowler's Landing, July 20; southern part of county. (129) W. D. KING, Buffalo, July 20; southern part of county.

## THE HIGHLANDS, OR HIGHLAND RIM OF MIDDLE TENNESSEE.

- Hickman*.—(130) J. M. GRAHAM, Pine Wood, July 30; lands of Piney and Duck rivers.
- Lawrence*.—(131) N. M. HOLLIS, West Point, July 20; southwestern part of county.
- Franklin*.—(132) J. F. ANDERSON, Anderson, January 26; civil district No. 12, southeastern corner of county; Crow creek valley.

## CENTRAL BASIN OF MIDDLE TENNESSEE.

- Giles*.—(133) D. T. REYNOLDS, Buford, February 12; northern part of county, waters of Richland creek. (134) T. O. ABERNATHY, Buford, April 1; northern part of county, waters of Richland creek. (135) J. E. ABERNATHY, Buford, April 10; civil district No. 13, northern part of county; waters of Big creek. (136) NEWTON WHITE, Pulaski, February 26; waters of Richland creek. (137) JIM RIVERS, Pulaski, February 10; waters of Richland creek. (138) J. N. PATTESON, Pulaski, February 10; waters of Richland creek and Elk river. (139) W. RIVERS, Pulaski, February 15; waters of Richland creek and Elk river. (140) J. J. LINDSAY, Pulaski, March 10; waters of Egnew's creek, west of Pulaski. (141) J. G. MASON, Prospect, February 13; civil district No. 2, southern part of county. (142) J. S. EDMONDSON, Bethel, January 21; southern part of county, Jenkin's creek lands. (143) J. F. PARKER, Bethel, February 14; civil districts Nos. 3 and 4, southwestern part of county. (144) J. K. P. BLACKBURN, Brick Church, March 27; eastern part of county, lands of Richland and Bradshaw creeks. (145) SAMUEL YOKLEY, Campbellsville, April 12; northwestern part of county, lands of Big creek. (146) T. B. WADE, Wales Station, February 4; lands of Pigeon Roost and Richland creeks, north of Pulaski.
- Lincoln*.—(147) M. D. HAMPTON, Fayetteville, June 28; lands of Elk river. (148) J. D. TILLMAN, Fayetteville, February 4; lands of Elk river.
- Moore*.—(149) E. Y. SALMON and others, Lynchburg, July 23; lands of Mulberry creek and Elk river.
- Bedford*.—(150) B. F. RANSOM, Fosterville, July 26; civil districts Nos. 5, 6, 8, and 11, northwestern part of county. (151) W. R. RANSOM, Shelbyville, July 19; lands of Fall creek, northwestern part of county. (152) Rev. M. F. THOMPSON, Unionville, July 22; civil district No. 11, northwestern part of county. (153) B. F. JARRELL, Rover, July 17; civil district No. 10, northwestern corner of county. (154) R. C. ALLISON, Rover, July 6; civil district No. 10, northwestern corner of county.
- Marshall*.—(155) J. F. BRITTAIN, Holt's Corners, February 10; northeastern part of county, Spring creek lands. (156) J. B. EZELL, Chapel Hill, July 1; Spring creek and Duck river lands, northeastern part of county. (157) W. B. GLENN, Chapel Hill, July 3; civil district No. 8, northeastern corner of county.
- Mauzy*.—(158) L. E. POLK, Columbia, July 10; civil district No. 11, southwestern part of county. (159) D. F. WATKINS, Columbia, February 4; western part of county, Big Bigby lands. (160) LEON FRIERSON, Columbia, February 14; civil districts Nos. 13 and 14, western part of county; Big Bigby lands. (161) J. W. FRIERSON, Columbia, February 14; civil districts Nos. 13 and 14. (162) J. B. WILKES, Culleoka, February 10; civil district No. 6, Fountain creek lands; southeastern part of county. (163) W. O. GORDON, Dark's Mills, March 22; lands of Carter's creek, north of Columbia.
- Williamson*.—(164) BROADWELL BROS., Franklin, May 10; civil district No. 8, north of Franklin; lands of Big Harpeth. (165) W. L. JOHNSON, Franklin, February 12; lands of Big Harpeth. (166) J. S. CLAYBROOKE, Triune, February 10; civil district No. 18, eastern part of county; lands of Wilson's creek and Harpeth river. (167) Dr. H. B. HYDE, Triune, January 25; lands of Wilson's creek and Harpeth river. (168) SAMUEL PERKINS, Triune, July 18; civil district No. 18, lands of Wilson's, Nelson's, and Arrington creeks. (169) S. A. POINTER, Thompson's Station, February 20; lands of Aenon and Harpeth creeks, and of Duck and Big Harpeth rivers. (170) T. F. P. ALLISON, College Grove, July; civil district No. 21, southeastern part of county.
- Rutherford*.—(171) ROBERT BRUCE, Murfreesborough, May 15; waters of Stone's river. (172) C. F. VANDERFORD, Florence Station, February 27; civil district No. 6, northwest from Murfreesborough. (173) Dr. R. B. HARRIS, Jefferson, February 29; northwestern part of county, Stewart's creek lands. (174) W. N. MASON, La Vergne, February; northwestern part of county, Stewart's and Overall creek lands. (175) A. M. McELROY, Fosterville, February 7; county generally. (176) W. S. BATTEN, Fosterville, February 6; southern part of county, lands of west fork of Stone's river. (177) J. W. SMITH, Smyrna, February 9; northwestern part of county, lands of Stewart's creek and of Stone's river. (178) A. H. SANDERS, Smyrna, February 5; Stone's river lands. (179) J. S. GOOCH, Smyrna, February 13; lands of Stewart's creek and Stone's river. (180) Dr. J. W. DAVIS, Smyrna, February 13; lands of Stewart's creek and Stone's river. (181) D. M. NELSON, Smyrna, February 10; lands of Stewart's creek and Stone's river.
- Davidson*.—(182) W. WEAVER, Edgefield Junction, June 28; northern part of county, lands of Cumberland river. (183) J. M. TURNER, Edgefield Junction, February 6; northern part of county, lands of Cumberland river. (184) W. A. DONELSON, Hermitage, July 13; northeastern part of county. (185) PHILIP EARHEART, Hermitage, February 2; northeastern part of county, Stoner's creek lands. (186) W. S. DONELSON, Hermitage, June 28; northeastern part of county, Cumberland river lands. (187) B. GRAY, La Vergne, Rutherford county, February 20; civil district No. 6, southeastern corner of county. (188) M. M. LEEK, Donelson, July; east of Nashville, Mill creek lands.
- Wilson*.—(189) E. H. THORNTON, Gladeville, June 26; southwestern part of county. (190) TURNER VAUGHAN, Laguardo, June; lands of Spencer's creek and Cumberland river, northwestern part of county. (191) W. C. DAVIS, Laguardo, July 8; lands of Spencer's creek and Cumberland river, northwestern part of county.
- Sumner*.—(192) J. G. MARTIN, Hendersonville, July 9; southwestern part of county; Drake's creek and Cumberland river lands. (193) HARRY SMITH, Hendersonville, June 29; southwestern part of county; Drake's creek and Cumberland river lands. (194) S. R. DOXEY, Hendersonville, January 24; civil district No. 5; Drake's creek and Cumberland river lands.

## VALLEY OF EAST TENNESSEE.

- Hamilton*.—(195) J. M. ELLIS, Chickamauga, June 24; southeastern corner of county.
- Polk*.—(196) ERLY BOYD, Benton, September 2; lands of Conasauga creek and of the Oconee and Hiawasse rivers, western part of county.

## OTHER CORRESPONDENTS.

- Grundy*.—R. S. CLARK, Pelham, March 15.
- James*.—J. A. GREEN, Ooltewah, July 1.
- Macon*.—M. F. WEST, Walnut Shade, January 30.

## SUMMARY OF ANSWERS TO SCHEDULE QUESTIONS.

[In the following pages the numbers placed before the county names are for reference to the table of correspondents.]

### TILLAGE, IMPROVEMENT, ETC.

#### 1. Usual depth of tillage (measured on land-side of furrow): What draft employed in breaking up?

MISSISSIPPI BOTTOM: From 4 to 6 inches, and usually with two mules or horses.

PLATEAU SLOPE OF WEST TENNESSEE: 3 or 4 and sometimes, though rarely, 6 and 8 inches; usually with one mule or horse. (51) *Haywood*: "Our freedmen, if left to themselves, will not go deeper than 1½ to 2 inches, while good farmers plow from 5 to 6 inches deep."

In *Gibson*, *Weakley*, and *Henry* counties the depth is 4 to 6 inches with double teams.

In the valley of the Tennessee, the Central Basin, and East Tennessee regions the usual depth is 4 to 8 inches, with double teams.

#### 2. Is subsoiling practiced? If so, with what implements, and with what results?

To a very limited extent throughout the state. The implements used are Blount's sulkies, Hughes', Avery's, Oliver's, and Dunn's plows; Brinley's and Murfee's subsoil plows. In many counties a bull-tongue is made to follow immediately behind a turn-plow. A majority give the results as good. (93) *Carroll*: Improves the yield the first year, but after that is of no benefit. (25) *Tipton*: No improvement the first year, but after that is beneficial. (45) *Haywood*: "When the land is subsoiled the clay retains the moisture only; no food for the plant. When the soil is turned under

deeply the moisture, in a dry season, will draw the roots of the plant to the bottom, where they find food also." (52) *Haywood*: Best for corn and cotton. (59) *Madison*: Especially good on old and worn-out land. (62) *Madison*: Diminishes the washing, increases the production, and lessens the effect of drought. (66) *Williamson*: Also increases the product in all seasons. (168) *Williamson*: Decided benefit if done in the fall; if in the spring, first crop is not so good.

#### 3. Is fall plowing practiced? With what results?

It is practiced to some extent throughout the state, chiefly on corn, wheat, or other cereal lands, or after a pasturing season. The picking season of cotton crops usually closes too late to permit the practice.

The results are usually good, the lands generally being more easily tilled after fall plowing, and yield better crops.

(7) *Lake*: Insects killed and clay land pulverized. (14) *Lauderdale*: Fall-plowing does no good on land that has been cultivated, but on sod-land it is very beneficial. (33) *Shelby*: The

lands are more liable to injury after washing rains, but otherwise results are good. (45) *Haywood*: In preparing the land for cotton after a wheat crop fall-plowing should be done; after corn or cotton it is not necessary. (91) *Carroll*: The results are not good; lands run together, and become hard and cloddy in spring. (134) *Giles*: It helps to protect lands against the washings of winter rains, and when green vegetable matter is turned under makes a better crop.

#### 4. Is fallowing practiced? Is the land tilled while lying fallow, or only "turned out"? With what results in either case?

To a small extent in all of the counties, but is not general, the lands being "turned out" for rest when becoming exhausted.

(11) *Lauderdale*: If the land is very rolling or hilly when left out it washes or gullies badly. If plowed deeply, turning under a green crop with all the litter, it does not wash. (26) *Tipton*: A few plow up; most turn out to weeds or clover; always beneficial, provided the land is protected from washing, and not tramped by stock. In clover the benefit is 100 per cent. (33) *Shelby*: Only by necessity when exhausted; is not tilled except it is sometimes sown in pease or planted in sweet potatoes without cultivation. To till without some crop to shade the soil is injurious; to "turn out" is of little benefit temporarily, and none permanently. (38) *Fayette*: Sometimes tilled, but never permanently turned out; the result is good when tilled, but better when turned out for twelve months; then subsoil and plant.

(51) *Haywood*: Some sow pease, which, when done in July, are turned under in September; but more "turn out" than otherwise. To let land lie out and permit the weeds to mature is, in my opinion, a great folly. Thus to mature seed by the million, with the expectation of improvement, is, I think, nonsense. I have urged farmers to turn weeds under and plant pease, or, if nothing better, to turn weeds under when green. (60) *Madison*: Summer fallowing is usually followed with fine results. (67) *Crockett*: To till the land impoverishes the soil; to "turn out" restores it. (145) *Giles*: After lying in clover or grasses for four or five years a good crop is expected. (169) *Williamson*: "Turning out" improves land if level and not tramped by stock; if rolling, it is injured more by washing than benefited by rest. (188) *Davidson*: Only turned out for persimmon orchards; good persimmons, fat opossums, and happy negroes.

#### 5. Is rotation of crops practiced? If so, of how many years' course, in what order of crops, and with what results?

Rotation is practiced quite generally throughout the state, and especially on farms where but little cotton is raised. Cotton is frequently planted for years in succession before being relieved

by other crops. There is, as a rule, no regular order of succession. Corn usually is planted after cotton, and often followed in turn by small grain and clover, sometimes pease. Results are always

excellent. The following extracts are given from reports: (4) *Lake*: Corn usually three to five years, cotton four to five years, wheat two to three years, clover two years. Results, increased production of 20 to 33 per cent. (11) *Lauderdale*: Cotton is usually succeeded the next year by corn, wheat, or oats, and cotton again the following year. (26) *Tipton*: Generally corn follows cotton, and *vice versa*; cotton on wheat stubble is the rule, and is highly beneficial where the land is fed by clover, pease, etc. Corn, cotton, and wheat rotated will impoverish the land. (45) *Haywood*: Cotton should not be planted the first year after clover; a crop of pease is a fine preparation for cotton. We find it best to rotate every year. (50) *Haywood*: Cotton is a great exhauster, and by rotation we save our lands and make better crops. (51) *Haywood*: Cotton, corn, wheat, and clover, with a mixture of herd's-grass and orchard grass, and let lie, including the wheat year, three years. Best results. I can then haul out manure in July, August, and September, and spread on the grass all the winter. Grass protects the manure in warm

6. What fertilizers or other direct means of improving the soil are used by you, or in your region? With what results? Is green-manuring practiced? With what results?

Commercial fertilizers are very rarely used in the state. Barn-yard and stable manure, or composts with these and cotton-seed, leaves, etc., comprise the fertilizers applied to lands, and are generally in use to their full extent in all of the counties. Land plaster also is frequently applied to clover lands, and sometimes when cotton is planted. (3) *Lake*: Only knew of one man hauling out manure from his barn, which he did to banish fleas. Our lands are too rich for fertilizers, but they would pay well on black land. (19) *Dyer*: When used, we make one-third more cotton. (26) *Tipton*: Sheep penned on poor spots. (34) *Obion*: Stable manures usually hauled out and spread broadcast in the spring; increased production in proportion to amount used. Most of the cotton-seed in this county is fed to cattle and sheep through the winter and returned to the soil in the form of manure, especially in the uplands. The bottom lands, being rich, are seldom fertilized, though when done they have bountifully repaid the cost with an increased yield and earlier maturity, and with a better fiber. (51) *Haywood*: Put all the old leaves, straw, corn-stalks, etc., into my barn-yard to let it absorb all the liquids possible, and when rotted haul out at leisure times. Scattered on poor clover land, bare spots, makes it better than the best. (57) *Madison*: Cotton-seed is one of the best fertilizers; its quick action as plant-food and its light weight to handle makes it preferable to anything else. All we need is something to kill the germ or grind the seed into meal while in the sound state, the meal, hulls and all, to be applied. It is thought by our best farmers that this would increase the crop 50 per cent. and improve the land every year. I think the seed is injured by heating or throwing into pens to rot. The meal from the oil-mills has double the strength. Very good results. (152) *Bedford*: The usual practice here is to plant small patches, from 1 to 5 acres, and manure well with barn-yard manure. By

7. How is cotton-seed disposed of? If sold, on what terms, or at what price?

It is largely sold to the oil-mills of Memphis, Jackson, and Nashville, except in the counties of the Highland Rim, western valley of the Tennessee, and valley of East Tennessee, prices being an average of about 10 cents per bushel, or \$7 to \$10 per ton. The seed is also largely used for fertilizers, and for feed to cattle and sheep during winter months.

(30) *Shelby*: All sold to oil-mills, which pay to the gins of Memphis,

8. Is cottonseed-cake used with you for feed? Is it used for manure?

Except in the immediate neighborhood of the mills, the cake is scarcely used for any purpose. In the towns it is sometimes fed to cattle, mixed with other food. (29) *Shelby*: We have to pay \$22 per ton, while New England farmers pay from \$15 to \$18 per ton. (33) *Shelby*: For feed, the price of the meal is too high. Near Memphis it is used in market gardens for manure. (42) *Hardeman*: For milch cows, mixed with bran; for dry cows it

weather from the burning sun, and gives a firm track for the wagon in muddy winter weather. (84) *Henry*: Alternate years, corn followed by wheat, cotton by wheat, and then corn; beneficial. (115) *Benton*: In planting cotton longer than two years on the same soil it don't open as well, neither does the lint grow so long. (120) *Decatur*: We sow oats and clover when the lands get too poor to make 500 pounds of seed-cotton. (135) *Giles*: Corn after clover, and sometimes wheat after clover; corn after wheat, and then allow to stand two years for grazing or mowing; land is kept in good condition by this rotation. Cotton-planters generally practice wheat rotation. (141) *Giles*: When cleared, corn is planted for three years, afterward cotton for four or six years, then small grain. (144) *Giles*: Sometimes the same crop is planted for ten years without change. (169) *Williamson*: Cotton, then wheat, then corn; then in wheat or oats, or clover, and then back into wheat or cotton. Land makes larger yields and improves daily.

this, 1,200, 1,500, and sometimes 1,800 pounds of seed-cotton per acre are raised. (169) *Williamson*: "I use Virginia plaster in great quantities, and with very satisfactory results. The best method is to soak the seed in water and then roll them well in plaster before planting. Make as much plaster stick on as possible. Treated in this way, the seed come up sooner and grow off more rapidly. The bugs, so troublesome on young cotton, seem to leave the plants raised this way earlier. The above is the most important application of plaster, yet it ought to be sowed on in addition after the cotton is thinned to a stand and when the dew is on the leaf. I recommend the thorough trial of plastering in this way. The benefits resulting are not as apparent in wet weather as in dry. The plaster adds 50 per cent. to clover and 33½ per cent. to cotton.

GREEN-MANURING is practiced to quite an extent in all of the counties; with pease and clover in all of the regions except the Central Basin, where clover is most popular. Results always excellent.

(11) *Lauderdale*: We regard red clover as the best fertilizer we have on a large scale. (45) *Haywood*: One good crop of clover restores the land almost to its original state. The cheapest and most certain way to improve our land is with pease when it is too thin for clover; yet when a stand of clover can be obtained by the use of land plaster, the land can be made in a few years as good or better than ever and pay in the meantime as a pasturage. (62) *Madison*: Soil is made deeper, lighter, and more easy to till. (160) *Maury*: With clover generally; pease are becoming popular as a fertilizer, and are sown more and more every year. All lands produce better after them. (169) *Williamson*: With clover, the land adds 33 to 50 per cent. to the cotton yield.

and within a radius of 5 miles, \$10 50 per ton; to others, \$9 per ton. (33) *Shelby*: Price is fixed by combination of oil-factories, with a forfeit of \$100 for any one paying more than the agreed price. (51, 52) *Madison*: Good farmers rot them and spread them on the land; negroes sell all they can and beg seed the next spring for planting.

is fed alone. As manure for any crops. (70) *Gibson*: For feeding cattle, only mixed with wheat, bran, or corn-meal. (109) *McNairy*: Just being introduced; too rich for feed alone; as manure for vegetables, not for cotton. (166) *Williamson*: By dairymen for increase of milk and butter; also used to fatten beeves. (192) *Wilson*: To some extent as manure.



## PLANTING AND CULTIVATION OF COTTON.

## 9. What preparation is usually given to cotton land before bedding up?

Fall plowing is very seldom done, except on stubble fields. If the land was in cotton the previous year, it is almost the universal practice to simply "bed up" between the former cotton rows, the old stalks being knocked down and plowed under.

- (29) *Shelby*: Cotton is never picked out in time for fall plowing. (50) *Haywood*: Listing is done as early in the spring as possible; that is, throw two furrows up, let it stand until time for planting, when "bedding up" is done. (51) *Haywood*: Fall or winter plowing is pursued by good farmers; spring plowing by those who

are always in a hurry, and who do everything out of time. (107) *McNairy*: If the ground is rough, it is either broken broadcast or rebudded in spring. Shallow plowing is gaining favor among our farmers and is now almost universally adopted, no center furrow even being run for the bed. The plant, when young, does much better in ground that is well settled together than in loose soil. (151) *Bedford*: A thorough breaking of the soil is made; best if done in the fall and bedded in spring just before planting.

## 10. Do you plant in ridges? How far apart? What is your usual planting time?

It is the universal custom to plant in ridges, the distance apart being from 3 to 4 feet, occasionally 2½ feet. This distance is great-

er on bottom lands. Planting time is from the 10th of April to the 1st of May.

## 11. What variety do you prefer? How much seed is used per acre?

Seventeen varieties of seed are named by correspondents, the "green-seed" being the most popular. A number of answers are to the effect that after two or three years all the varieties become "green-seed". In many cases no special variety is chosen, the seed being mixed.

The following varieties are given by correspondents: Java Prolific, 16 correspondents; Sugar-loaf and Dixon, 9 each; Taylor, 8; Petit Gulf and Peeler, 7 each; Boyd Prolific, 5; Cluster, 4; Matagorda Silk, 3; Williams (N. C.) Prolific, 2. The following 1 each: Johnson, Schneider, Triple Twin, Golden Prolific, Arkansas Silk, Cheatham Prolific, and Tennessee Green-seed.

- (9.) *Lauderdale*: The Taylor or Matagorda Silk is a good long staple. Dixon or any short staple lint and white seed is better than green-seed. (22) *Dyer*: Southern seed preferred here; after a few years' cultivation the seed becomes green and the lint

shorter. (51) *Haywood*: Sugar-loaf degenerating into "green-seed" is the best where large crops are planted, as it will wait on the picker without falling out. Taylor cotton (Matagorda Silk?) has the longest staple and sells from ¼ to 1½ cents more per pound. Java Prolific and Boyd's Extra Prolific grows in bunches, and if early would suit new land the best. (62) *Crockett*: No variety does well under four or five years' planting unless imported from the north of us. (158) *Marshall*: Our seasons are short, and many of the varieties that can be used south will not mature here; hence the Petit Gulf or regular green-seed is preferred. (175) *Rutherford*: The seed from the more southern states yield plants that run to weed and do not boll.

Two to four bushels are usually used per acre; sometimes a great deal more.

## 12. What implements do you use in planting? Are "cotton-seed planters" used in your region? What opinion is held of their efficacy or convenience?

Some farmers use plows to open the rows; the seed is planted by hand and covered with a harrow or board. Cotton-seed "planters" (largely home-made) are, however, mostly in use in all of the counties in the western part of the state where the lands are suitable, and to some extent in the central and eastern counties. The complaint in Lauderdale is that they cover the seed too shallow, and thus in dry weather it is very difficult to obtain a stand; otherwise they are highly esteemed in all of the counties by the majority of those who use them. (7) *Lake*: They are

indispensable to large planters. (9) *Lauderdale*: Good, if properly managed, especially for early planting; they save much work, and put in the seed better than hand-planting. (34) *Obion*: Save seed, and save work in chopping out. (44) *Hardeman*: Save seed, put it in thin, and in a very straight drill, which is advantageous. (145) *Giles*: Convenient if the seed are rolled. (146) *Giles*: Good for intelligent labor, generally a nuisance. (153) *Bedford*: Are looked upon with suspicion. (194) *Sumner*: Convenient, but "stands" are bad.

## 13. How long, usually, before your seed comes up? At what stage of growth do you thin out your stand, and how far apart?

The time given varies very greatly, and is dependent on weather. In good seasons the plant makes its appearance in about a week or ten days; in wet weather earlier, and in dry sometimes as late as two or three weeks. When it has attained a growth of several inches, or has put out three or four leaves, it is thinned out, usually leaving several plants in a place at distances of from 15 or 18 inches on bottom lands and from 8 to

12 on the uplands. Afterward these plants are again thinned, leaving one or two in a hill, though many planters thin to this at the first. The first thinning is by many done as soon as possible after the crop is well up, so that a "scraper" can be used. (69) *Gibson*: When the land is damp, the plant appears in six days; when dry, in two weeks.

## 14. Is your cotton liable to suffer from "sore-shin"?

"Sore-shin" attacks the young plants to some extent throughout the state, and is attributed by planters to a number of causes, but mostly to cool and wet weather in the spring months and to injury by hoes.

- (9) *Lauderdale*: When wet and cold, especially if the ground is not

bedded up in time to let it settle before the plant comes up. (31) *Shelby*: In cold, wet weather if the dirt is thrown to it. (44) *Hardeman*: In very windy weather when very young. (160) *Mauzy*: On old cotton land. (169) *Williamson*: If worked too soon and not plowed immediately after the hoes.

## 15. What after-cultivation do you give, and with what implements?

- (1) *Lake*: Scrape, hoe, and plow with a small shovel plow, and then run close to the cotton with double-shovel and sweep. (9) *Lauderdale*: Scrape, hoe, sweep; scrape again, hoe, and sweep, and sometimes scrape the third time if the grass is bad, and follow with hoe and sweep. Generally go over the crop three times. Many use the scraper only once, but I find scraping saves much hoeing, and is cheaper. (31) *Shelby*: In old land

plow deep with shovel plows; in fresh land, shallow, with a 20-inch shovel plow. (43) *Hardeman*: Scrape and thin to a stand; then run two furrows with 16-inch shovel plow and hoe again; then two furrows with turning plow if wet or with 18-inch shovel plow if dry; plow again with turning plow and hoe again. (51) *Haywood*: Light harrowing and shallow culture toward the last; the side harrow is a great leading implement

in dry weather. Cotton is a plant that will wait upon the lazy producer and seemingly be as good in his fields as in others, but at gathering time the tale is told. (53) *Madison*: Small shovel once; large shovel, get further off and shallower as the plant grows larger. (57) *Madison*: I first scrape down and pass the hoes through it, leaving it in bunches, say four or five stalks in a bunch. Then I follow the hoes with a turning plow, and thus keep a good bed to the cotton. I think the cotton grows best in the good beds. Should I be pressed with the grass or any other trouble, this culture gives me the advantage. I can scrape it down again, and the hoes can cut it to a stand, leaving one or two stalks every 8 or 10 inches. Then follow the hoes again with the turning plow to keep the middles clean. Cotton should be thinned to a stand by the 20th of June, and should be in clean and good fix; otherwise we cannot expect it to pay us for our trouble. (167) *Williamson*: Bull-tongue and shovel plows; then Carey plows next the cotton; split the middles out with shovels or sweep, Carey or Avery plow. (169) *Williamson*: Continue to use the hoe and to plow with small turning plows or bull-tongues with small sweeps attached behind them. Close and deep plowing after the 15th of June is very injurious if dry. In cultivating cotton the land should be broken up early and deeply in the springs, say to a depth of 6 to 10 inches. (It is

better to break in the fall and rebreak in the spring.) In bedding, the plows should be sharp and put in the ground as deeply as the teams can pull them. In giving the cotton the first plowing it is well enough to let the plow into the ground deeply, but after the 15th day of June deep plowing is injurious. After the 15th of July, and I might say perhaps after the 10th of July, deep plowing is ruinous, and the worse if done in dry weather. By using plaster freely both before and after planting and working the ground once in every twelve days, running further from the cotton each time and seeing that your laborers at the last plowing almost take their plows out of the ground, I will insure 1,000 pounds of cotton to the acre on a good land in Williamson, Maury, or Giles, providing the season is a fair one for cotton culture. (172) *Rutherford*: The scraper is first used for the double purpose of destroying young grass and weeds and to straighten and trim the row of plants to a thin line. Plants are "chopped" with the hoe to a stand. Subsequent cultivation with the plow, so done as to keep the bed and middles clear of grass and weeds and to promote vigorous "stocky" growth. (183) *Davidson*: With plows or shovels keep it hilled up so it will not fall down, and keep it chopped clean in the drill. It will depend upon the seasons how often it is worked.

16. What is the height usually attained by your cotton before blooming? When do you usually see the first blooms?

In the Mississippi bottom region plants usually reach a height of from 18 to 30 inches; throughout the rest of the state it varies greatly, even in the same counties, but is usually 12 to 18 inches, sometimes but 6, and sometimes 24 inches.

The earliest date given in which the first blooms appear is the 10th of June, in Madison county (62). In Lake, Lauderdale, and Dyer the last of June or 20th to 30th. Throughout the rest of the state, July 1 to July 10.

17. When do the bolls first open?

"Latter part of July:" (3) *Lake*, (29) *Shelby*, (73) *Weakley*, (142) *Giles*, and (190) *Wilson*.

"August 1 to 15:" (7) *Lake*, (9) *Lauderdale*, (21) *Dyer*, (33) *Shelby*, (44) *Hardeman*, (46) *Haywood*, (59) *Madison*, (82, 84) *Henry*, (93) *Carroll*, (95, 103) *Henderson*, (110) *McNairy*, (112) *Benton*, (119)

*Decatur*, (127) *Hardin*, (133, 137) *Giles*, (151) *Bedford*, (162) *Maury*, (165) *Williamson*, (174, 176) *Rutherford*, *Hamilton*, and *Polk*.

In other counties, from the 15th of August to the 1st and 10th of September.

18. When do you begin your first picking? How many pickings do you usually make?

Picking begins as soon as there is enough cotton open to make a day's work (50 or 75 pounds); the usual time is from the 1st to the 10th or as late as the 15th of September, though in the western part of the state some picking is done a little earlier. (4, 7) *Lake*: 15th of August to 1st of September. (14) *Lauderdale* and

(34) *Obion*: 20th and 25th of August. Two and three pickings are usually made, the crop being picked over as rapidly as possible, and as often as necessary to gather all the cotton. Sometimes the seasons are late, and only one picking is made.

19. Do you ordinarily pick all your cotton? At what date does picking usually close?

All of the cotton is very generally gathered throughout the state, excepting of course that which falls to the ground before the picker reaches it. Help is usually employed in gathering the crop, and is paid by the 100 pounds of seed-cotton. In the western part of the state picking usually closes about the 25th of

December, though it is frequently continued to the 1st of February, and even March, when the crops are large. In the Highland Rim, the Central Basin, and East Tennessee regions it closes by the 25th of December, and sometimes earlier.

20. At what time do you expect the first "black frost"?

Usually about the 10th or 20th of October. Some reports give an earlier and some a much later date. (52) *Haywood*: The last of September. (6) *Lake*: Middle of November. (31) *Shelby*: Usually November 1, though I have had cotton killed in September. (54) *Madison*: December 1. (66) *Crockett*: 15th of November.

(106) *McNairy*: Latter part of November. (131) *Lawrence*: Freezing weather November 1 to 10. (136, 138, 140) *Giles*: White frost 15th to 20th October. (159) *Maury*: November 15. (165) *Williamson*: November 20. (183) *Davidson*: Cotton and bolls killed October 15. (185) *Davidson*: About middle of September.

21. Do you pen your seed-cotton in the field, or gin as the picking progresses?

Both methods are practiced, according as the crop is large or small. Cotton is usually penned in the field if crops are large and sent to gin as fast as possible, the latter being kept running all the time. On small farms the seed-cotton is usually housed at home and sent to gin as soon as a bale is gathered. (33) *Shelby*: Never

pen in field, as country stores would get much of it. (51) *Haywood*: Make rail pens and line the inside with boards, perpendicularly placed. In this way, with a good cover, the cotton is kept dry, and much labor and time are saved.

## GINNING, BALING, AND SHIPPING.

22. What gin do you use? How many saws? What motive power? If draft animals, which mechanical "power" arrangement do you prefer? How much clean lint do you make in a day's run of 10 hours?

Gins of twenty-four different names or patents are mentioned by correspondents, as shown below. Number of saws vary from 40 to 80. Both steam-engines and draft animals are used as a motive power. With the latter the inclined tread-wheel is quite popular in some of the counties.

- (20) *Dyer*: Prefer steam first, then inclined wheel, then lever power.  
 (43) *Hardeman*: Old-fashioned gin-gearing, spur-wheel, and band-wheel. (51) *Haywood*: Gins of eighty saws are being used all over the county by men who do nothing but gin for the public. Steam gins are preferable, but farmers who have many mules are glad to have them at work. This ginning is hard on the mule. (134) *Giles*: The "Robinson Bevel Gearing" makes the lightest draft for the amount of speed given the gin. (135) *Giles*: The old-style large wooden driving-wheel with cast segments and cast pinion. (172) *Rutherford*: The sweep power, with 12-foot main driving-wheel, with band-wheel 6 to 8 feet diameter, driven by pinion from main wheel, gin-pulley usually 8 inches diameter.

## CAPACITY OF GINS AS GIVEN BY CORRESPONDENTS.

## PRATT'S GIN, mentioned in 18 counties:

	Pounds.
60 saws, by steam-engine.....	2,300 to 4,000
60 saws, by 4 horses or mules.....	1,800 to 2,000
50 saws, by steam-engine.....	2,500 to 3,300
50 saws, by 4 horses or mules.....	1,000 to 1,800
50 saws, by 6 horses or mules.....	2,000
50 saws, by tread-wheel.....	1,000 to 1,500
45 saws, by horse-power.....	1,500

## CAROW GIN, mentioned in 15 counties:

80 saws, by 10 horse-power steam-engine.....	2,500 to 3,000
70 saws, by mules (draft-wheel).....	800 to 1,000
60 saws, by steam-engine.....	2,750
60 saws, by 45 horse-power steam-engine.....	3,750
60 saws, by 6 or 8 mules on inclined wheel.....	1,000 to 1,500
50 saws, by 16 horse-power steam-engine.....	2,625

## GULLETT GIN, mentioned in 14 counties:

80 saws, by steam-engine.....	3,200
60 saws, by 12 horse-power steam-engine.....	3,500
50 saws, by 16 horse-power steam-engine.....	2,625
50 saws, by 8 horse-power steam-engine.....	3,200
50 saws, by tread-wheel.....	1,200 to 1,500

## BROWN'S GIN, mentioned in 10 counties:

80 saws, by steam-engine.....	4,000 to 6,000
60 saws, by tread-wheel.....	1,850
50 saws, by mules and tread-wheel.....	1,200 to 1,500
50 saws, by mules or horses.....	1,350 to 2,000
50 saws, by water-power.....	1,700 to 2,000
40 saws, by mules.....	900

## EAGLE GIN, mentioned in 9 counties:

80 saws, by 20 horse-power steam-engine.....	4,000
50 saws, by 10 horse-power steam-engine.....	3,000

23. How much seed-cotton, on an average, is required for a 475-pound bale of lint?

The estimate varies very greatly even in the same county, and is between 1,545 and 1,660, or even 1,780 pounds, without regard to regions. The number of pounds required is, as stated by one of the correspondents (16 Lauderdale), early, 2,140, late, 1,545,

	Pounds.
50 saws, by 4 mules.....	1,000 to 1,700
40 saws, by mules on inclined wheel.....	900

## SMITH'S GIN, mentioned in 6 counties:

70 saws, by steam-engine.....	4,000 to 5,000
60 saws, by steam-engine.....	3,000
60 to 80 saws, by inclined wheel and mules.....	2,000
50 saws, by mules.....	1,500

## HICK'S GIN, mentioned in 6 counties:

70 saws, by steam-engine.....	2,000 to 3,000
50 saws, by mules.....	1,500
45 saws, by mules.....	1,000

## WINSHIP GIN, mentioned in 4 counties:

60 saws, by 12 horse-power steam-engine.....	3,750 to 5,000
50 to 60 saws, by inclined wheel and mules.....	1,500
40 saws, by steam-engine.....	1,850
40 saws, by mules.....	1,200

## NEEDLE GIN, mentioned in 4 counties:

60 saws, by 12 horse-power steam-engine.....	7,000
50 to 60 saws, by horses or mules.....	1,500

## ROBINSON GIN, mentioned in 4 counties:

50 to 60 saws, by horses or mules.....	1,500
--	-------

## NANCE GIN, mentioned in 3 counties:

60 saws, by inclined wheel and mules.....	1,150
55 saws, by mules.....	1,500

## EMERY GIN, mentioned in 3 counties:

50 saws, by horses.....	1,200
45 saws, by horses (lever power).....	1,500

## STAR GIN, mentioned in 3 counties:

50 saws.....	1,500
--------------	-------

## MAGNOLIA GIN, mentioned in 2 counties:

80 saws, by steam.....	3,200
------------------------	-------

## GEORGIA GIN, mentioned in 2 counties:

60 to 80 saws.....	2,000
50 saws.....	900 to 1,100

## The following gins in 1 county each:

Kingsland, Fergusson & Co., 50 to 80 saws, by horse-power.....	2,000
Chafin (home-made), 50 saws, mules.....	1,500
Phoenix, 50 saws, 6 mules.....	1,700
Latham, 50 to 60 saws, mules.....	1,500
Webb, 50 saws, mules.....	1,500
Wilkerson, 50 saws, mules.....	1,500
Elliott (home-made), 60 saws, tread-wheel.....	1,500
Hall and Satter's gins (capacity not given).	

24. What press do you use for baling? What press is generally used in your region? What is its capacity?

There are 25 patented iron-screw presses reported in the state, while in many of the counties the old style home-made wooden press is still in use. The capacity of the iron-screw presses with sev-

eral men and one mule is from 10 to 15 bales per day. Some report Brooks' as much as 20 bales. The following list embraces those reported: Wilson press in 8 counties; Brooks' and

dependent upon the time that elapses between picking and ginning; the earlier the greater the weight. Very few estimates are as low as 1,425, the general average being about 1,600 pounds.

Scofield's presses in 7 counties each; Arrow and Reynolds' in 5 counties each; Finley and Cheek in 4 each; Deering in 3 counties; Southern Standard, Nesbit, Collins, and Ferguson presses in 2 each. The following in 1 county each: Caruthers, Crenshaw, McDermott, Reeder, Winship, Lewis, Russell, Rutherford county press, Spread Eagle, Shearer, Jackson, and Janney's. "The old wooden press is clumsy and slow;" with 2 men and 1 mule it will press about 4 bales per day. (51) *Haywood*: Reynolds' revolving press. There is no lifting of cotton in this press; it

25. Do you use rope or iron ties for baling? If the latter, what fastening do you prefer? What kind of bagging is used in your region?

Iron ties are used exclusively in all of the counties, except Polk, in the valley of East Tennessee, where rope is reported. The fastening embraces three kinds, the arrow, the buckle, and the but-

26. What weight do you aim to give your bales? In this respect?

A weight of 500 pounds is aimed at almost universally, freight being charged per bale regardless of weight. A requirement is made that each bale must be over 400 pounds; otherwise a deduction of \$1 or more is made from its price by merchants. (37) *Fayette*: Bales under 350 pounds are not merchantable. Whether this regulation is laid down by railroad companies or boards of

is rolled in by men and boys. It can't be used by steam as yet. With men, boys, and 1 mule it will make 1 bale every 45 minutes. Nesbit's press, by steam, will press a bale every 30 minutes. (175) *Rutherford*: With two horses or mules we can make a bale of 600 pounds with the old wooden-screw press. The box or hay press works by lever power, and 2 strong men can make a 500-pound bale. The patent iron-screw presses are superior to the others.

ton or Beard tie, and are about equally preferred. Jute, hemp, and flax 2-pound bagging are used, the first two, and especially hemp, having the preference.

Have transportation companies imposed any conditions

trade I do not know. (172) *Rutherford*: The railroad companies make no distinction as to weight of bales, the sizes being nearly the same, whether light or heavy. About 24 bales of uncompressed cotton will fill an average car; the freight charges are therefore based upon bulk rather than upon weight.

### DISEASES, INSECT ENEMIES, ETC.

27. By what accidents of weather, diseases, or insect pests, is your cotton crop most liable to be injured? At what dates do they usually make their appearance?

*Caterpillars* have only appeared, though very rarely, in the counties of Lauderdale, Tipton, Shelby, Fayette, Hardeman, Haywood, Madison, Weakley, Henry, Franklin, Giles, Lincoln, Maury, Williamson, Rutherford, Davidson, Wilson, and Sumner. They are by some considered a benefit to the cotton crop. The *boll-worm* has sometimes appeared in these counties, and also in Carroll, McNairy, Benton, Decatur, and Moore. The *cut-worm* in a few counties in the western part of the state appears early in May and does some damage. *Lice* (*Aphides*) are quite a common enemy to the plant in May, except in East Tennessee, where no mention is made of them.

28. To what cause is the trouble attributed by your farmers?

The various diseases are commonly attributed to extreme changes of weather. The following extracts are made: (49, 50) *Haywood*: Rust is considered an insect originating from old stumps and decaying wood, and appears most frequently in new ground. (51) *Haywood*: Blight or blasting rust, as some call it, often in dry spells of weather late in August. Rust and shedding of bolls are among our great evils. What causes rust I do not think is well known; what it does we know well. It is an insect, like the rust of the raspberry leaves, wheat, oats, etc. It comes generally on new land, and mostly around hickory stumps, but often not a stump of any kind is visible. Rain often arrests it. I tried salt last year, throwing it over the stalks and suffering much of it to settle around the stem at the ground. My field of 15 acres which was attacked was saved, but I cannot say the salt did it, for a rain came in a few days, and this might have arrested it. Rust is not to be confounded with what is termed blasting, which is a species of rust caused by extreme dry weather, and will spread over a field in a day or two; this is worse on old land than on new. As to the shedding of bolls, if even one-third of those that fall could be made to stick and do the work nature seems to have intended for them we could raise a bale of cotton

29. What efforts have been made to obviate it? against the caterpillar?

As a rule no efforts have been made against insects or diseases; Paris green has not been used. (11) *Lauderdale*: None that I know of, except to burn the old stumps and trees in the field where it usually prevails; it almost always begins near one of these, and is generally recognized as an insect. It is hard to tell as to success, as rust may be very injurious to the crop one

The diseases incident to the weather, such as shedding, rot of bolls, rust, blight, etc., are prevalent in all of the counties to a greater or less degree and in summer months. (9) *Lauderdale*: The caterpillar has never come early enough to do any serious damage, but sometimes does good by stripping leaves off. Lice in May and June do much damage by retarding growth and sometimes kills young plants. (51) *Haywood*: In cold, rainy, sunless weather cotton suffers greatly, first, from a general shrinkage of the stalk, sore-shin, and black leaf, and then death, or a shock from which it very slowly recovers. Then lice prey upon it until the 25th of June, but if the weather is hot no injury is done.

(500 pounds) every year to the acre. To prevent shedding, the best plan, I think, to be pursued is to subsoil the row over which the cotton stalks grow; that is, after fallowing deeply, say in February or March, when the rows are to be laid off, run in this furrow a subsoil plow, then bed on this. The cotton plant, having a long tap-root, can get down easily to moisture, and if any good fertilizer suitable for cotton is there this tap-root certainly would have plant-food far removed from the blasting influence of a drought. I have tried this on a small scale, and the cotton raised did not shed the bolls half so much. (110) *McNairy*: Red rust is more prevalent during very dry weather; the black rust is caused by excessively wet weather, and both are thought to be parasitic. (121) *Decatur*: Black rust on wet land to wet weather; on uplands, the red rust to dry weather. (133) *Giles*: Blight is caused by applying the soil to the plant too freely in dry weather and rain following in less than five days; shedding is caused by deep culture and want of moisture; rust is caused by excess of lime in soil and deep culture, followed by dry weather, checking the growth suddenly, and to the peculiarity of season and improper culture.

With what success? Is Paris green used as a remedy

season and may not appear even in the same field the next. (14) *Lauderdale*: I try to obviate the rust by plowing with a light plow, so as not to disturb the roots of the cotton. I think it is benefited, but don't know to what extent. (26) *Tipton*: None, except rotation of crops and turning under vegetable matter. A few claim that lime broadcast prevents rust

and blight. Some farmers of good sense ascribe rust to the presence or near vicinity of the poke-root. Rotation appears to relieve rust. We have never been troubled with worms. A variety of caterpillar occasionally strips off all the leaves the last of August. This stripping has always proved to be of service by hastening the maturity and opening. (42) *Hardeman*: Shedding in dry weather stopped to some extent by continued plowing; rust, pull up first stalks and burn or bury; this often stops it from spreading. (44) *Hardeman*: We have begun to practice rotation and putting our land in better condition. Marked improvement. Paris green not used. It is said to be a remedy, but is too poisonous to be handled. Let the birds live and they go as far in destroying the caterpillar as nostrums now used. (51) *Haywood*: Some have burned up every hickory stump and tree in the field, but shallow culture with broad shovel and side harrow, and never plowing when the land is

wet, has been our best protection. (57) *Madison*: None but to pull up the plant affected and carry it out of the field. I have stopped the red rust in that way in its early stage. The black rust seems to spread so fast that it is useless to try to stop it. (107) *McNairy*: Have known common salt sown when the plant was wet with rain or dew, which was thought to check it. (108) *McNairy*: Success is attained only on well drained and well-cultivated lands. (120) *Decatur*: Light harrowing is good after the plowing is done in dry weather to prevent the droppings. One furrow in the middle is good to keep it from baking if likely to be too wet. (169) *Williamson*: Plaster is used to drive off the bugs; running the plow far off and plowing shallow will prevent red rust; change of weather from wet to dry alone will stop black rust and August shedding. Good success.

30. Is rust or blight prevalent chiefly on heavy or ill-drained soils? Do they prevail chiefly in wet or dry, cool or hot seasons? On which soil described by you are they most common?

Blight is prevalent chiefly on ill-drained soils, in extremes of weather, and on either heavy or light soils.

Rust appears, apparently regardless of weather or character of lands, as seen in some of the following replies:

(9) *Lauderdale*: Blight does not appear uniformly on heavy and ill-drained soils; in some cases land that had been formerly planted in corn escaped blight, when dry cotton land in the same field suffered. Blight is more frequent on wet lands and bottoms. (12) *Lauderdale*: Rust on high land, blight on low; prevails in extremes of weather. Rust on mulatto and blight on black sandy land. (14) *Lauderdale*: Light soils suffer more from rust, new land more than old. Wet, damp weather for blight; cool, dry seasons for rust. The blight on heavy soil, and the rust on new or that recently put in cultivation. (23) *Tipton*: Very seldom on old lands; always in violent changes of temperature. (31) *Shelby*: In all extremes of weather; red rust is more common on light soils in hot, dry weather; black rust on heavy soil in cool, wet weather. (37) *Fayette*: Eccentric and sporadic, but this law of generation don't seem connected much with soils. (49, 51) *Haywood*: It seems worse on loose, black, friable soils. Dry and hot weather. On a black, porous, mellow, friable soil rust seems to do its worst. Hickory land is thought to be more subject to it than other classes of timbered land, yet I have seen it on purely poplar land. (57, 59) *Madison*: Hot and dry, often too much wet weather. On uplands, first appearing around or near stumps or dead trees and near the fence, especially if poke-stalks grow about them.

(104) *McNairy*: On uplands as bad, if not worse, than on bottoms. The kind of season does not seem to affect it. No soil is exempt; bottom lands are cleanest, and fresh uplands most subject to it. (107) *McNairy*: Buckshot land does not have rust. Loose hazel soil is most subject, and in cool seasons. Rust does not damage cotton on wet, heavy soils. (109) *McNairy*: Wet, hot seasons. Red rust on very loose, loamy soil, with gray subsoil containing black, angular gravel; black rust on yellow-gray soil; subsoil same as above. (110) *McNairy*: Red rust is prevalent on well-drained land; black rust on any. Red rust in dry, black rust in wet seasons. On our black sandy loam, hazel-nut and poplar lands we have red rust if the weather is very dry; the black rust is common to any soil. (122) *Decatur*: Light soils. Dry, hot seasons; some spots of black land in wet seasons on dry, high sandy soils. Rust is unknown on clay soils in this vicinity. (146 and others) *Giles*: On black soils, extreme wet or dry weather. Black rust on black soil, red rust on any soil, by sudden checking of growth, caused by deep culture or dry weather. (158) *Marshall*: Blight is very rare here; is produced by wet weather; rust by dry weather; gravelly lands most subject to it. (160) *Williamson*: Red rust is worst on poor land; black rust in wet weather, on low, rich bottom land; red rust in dry weather on poor upland. (190) *Wilson*: Heavy soils, wet and cool weather, on low and wet lands. Wood-ashes and lime greatly counteract this disease in the cotton-plant. (194) *Sumner*: Dark loam land, known as blue-grass land, is most liable to rust.

### LABOR AND SYSTEM OF FARMING.

31. What is the average size of farms or plantations in your region? Is the prevalent practice "mixed farming" or "planting"?

In the Mississippi river bottom region there are many small farms of from 10 to 50 acres. Other farms contain 100 to 300 acres, and some as much as 800 to 1,000 and 1,500 acres. In the counties of the adjoining region of West Tennessee the size of farms vary very greatly, from 50, 100, to 500 acres, and more in a very few instances: (38, 39) *Fayette*: 640 to 3,000. (51) *Haywood*: 500 to 2,000. (104) *McNairy*: 100 to 1,000. In the western valley of the Tennessee the farms contain mostly 100 acres and less, a larger number seldom being reported, and then in no instance more than 500. In the Highland Rim region 100, 150, to 200 acres are given as averages. In the Central Basin the same

variation occurs as in West Tennessee, the greater number of average estimates falling below 500 acres, and mostly from 100 to 300. The following extreme sizes are given, but not as an average of the county: (137, 138) *Giles*: 1,000 and 1,800 acres. (155, 156) *Marshall*: 1,000 acres. (167, 169, 171) *Williamson*: 800 and 2,000 acres. (178) *Rutherford*: 1,000 acres. (185) *Davidson*: 1,100 acres. (192) *Sumner*: 3,000 acres. In the valley of East Tennessee the average of 200 acres is given.

Mixed farming is the prevalent practice throughout the state, though some planting is done in Lake, Lauderdale, Tipton, Fayette, Hardeman, Haywood, Madison, and McNairy.

32. Are supplies raised at home or imported, and if the latter, where from? Is the tendency toward the raising of home supplies increasing or decreasing?

In all of the counties but Shelby, and largely in Hardeman, the greater part of the supplies are raised at home, only a comparatively small portion being brought from Saint Louis or New Orleans. (30) *Shelby*: Very few are self-sustaining; most everything, from a pin to a steamboat, is brought from Memphis. (32) *Shelby*: Our good farmers raise their own; others raise cotton only, and buy supplies. (43) *Hardeman*: The greater part of

the meat and all of the flour for laborers and landlord are imported from Saint Louis and Cairo.

All of the correspondents report the tendency toward raising supplies as increasing, or in some cases as stationary, except (45) *Haywood*, (99, 103) *Henderson*, (137) *Giles*, (184) *Davidson*, (33) *Shelby*; with whites, increasing; with negroes, decreasing.

33. Who are your laborers chiefly? whites, of what nationality? How are their wages paid—by the year, month, or day, and at what rates? When payable?

Mostly negroes in West Tennessee, while in the western valley of the Tennessee and regions eastward the whites predominate, among whom are very few foreigners, a few Swedes in Tipton, and Germans in Decatur. Wages are mostly paid by the month at from \$8 to \$12, payable at the end of the month. Yearly

wages are from \$100 to \$125, payable as needed or when due. Daily wages are from 50 to 75 cents and \$1, payable at the end of the day or week. Board is included usually with monthly and yearly wages. Women receive lower wages than men.

34. Are cotton farms worked on shares? On what terms? Are any supplies furnished by the owners?

The share system is prevalent throughout the state, supplies being often furnished by the owner. When the owner furnishes land only, the laborer delivers to him one-third of the crop or one-fourth the cotton and one-third the corn. When supplies, such

as teams, implements, seed, etc., are furnished by the owner, the crop is evenly divided. There is but little, if any, deviation from this rule in any of the counties.

35. Does your system give satisfaction? How does it affect the quality of the staple? Does the soil deteriorate or improve under it?

With but few exceptions the system seems to give satisfaction throughout the state. Nearly all of the replies indicate no material change in quality of staple, but a great deterioration in soils. In some an improvement in both staple and soil is noted. (1) *Lake*: Makes staple trashy, and leaves soil foul and hard to cultivate. (19) *Dyer*: Change in soil depends upon the attention of the owner. (29) *Shelby*: Poor cultivation makes poor staple, and vice versa. (43) *Hardeman*: A disadvantage to staple; with hired labor the owner can direct how and when to gather.

(44) *Hardeman*: Whites lose by farming on shares. Negroes are unwilling to manure the land because of extra work. (110, 111) *McNairy*: Staple injured by careless and late picking; hilly land deteriorates, level land does not. (172) *Rutherford*: Staple not so good nor lint so clean as when by hired labor under control of owner. Most negroes are averse to hiring for wages, because of an idea that croppers have greater privileges. (192) *Sumner*: Satisfaction given unless negroes get too many orders for dry goods and groceries.

36. Which system (wages or share) is the better for the laborer?

The advocates for shares and wages are about equally divided in number. Their reasons may be summed up as follows:

**SHARES**: In the end brings him twice the amount of money. He gets some hogs and cattle of his own, if at all thrifty; is interested, does more, and does it better. The incentive to work is greater. With good judgment and a family he does best on shares, because the children, 10 to 15 years old, are just as efficient with the cotton hoe and as pickers as a German worth \$20 per month if the father and mother will attend to them. He has a home

where he can raise his own supplies, is more independent, and a better citizen. They are too much inclined to spend their wages. **WAGES**: Runs no risk and makes more money. He gets his money, spends it, and don't conclude that he has been swindled because he has no money at the end of the year. Because of his disposition to neglect the crop when not under control he is kept at work, and avoids temptation to crime and vice. He gets the benefit of the owner's experience and direction, and pays cash for supplies, and at cheaper rates.

37. What is the condition of the laborers? What proportion of negro laborers own land, or the houses in which they live?

The condition of the laborer throughout the state is generally either good or moderately so, especially among the industrious classes; and though often "poor" and dependent, but few are in actual want.

A very small part of the negroes own land, or even the houses in which they live.

(67) *Crockett*: They are mostly self-sustaining. In this part of the

county the more thrifty colored people, those who own horses and mules and have their own provisions, as a general thing are renters. They pay so much rent and run the farms themselves. The share croppers, as a general rule, are those who own no stock; have no provisions at all, or only in part. This class does not make much advance.

38. What is the market value of the land described in your region? What rent is paid for such land?

The prices naturally vary very greatly, according to amount of improvements. In the alluvial region of the Mississippi, from \$5 to \$50, and rents from \$3 to \$5 per acre. In the counties of West Tennessee and valley of the Tennessee, from \$5 to \$25, and rents from \$3 to \$5 per acre. On the Highland Rim they

are valued at \$15, \$20, and \$60, and rent for \$5 per acre. In the Central Basin prices vary from \$5 and \$10 to \$40, \$50, and even \$100 per acre; rents, from \$1 to \$5 per acre. In the valley of East Tennessee, values from \$5 to \$50 per acre.

39. How many acres, or 400-pound bales, per "hand" is your customary estimate?

On Mississippi river alluvial lands, 10 acres and 10 bales; sometimes much more is made. On the uplands of the rest of the

state the usual estimate and average is about 4 bales with other crops, or 6 or 8 bales if cotton alone is planted.

40. To what extent does the system of credits or advances upon the growing cotton crop prevail in your region?

It prevails to a considerable extent throughout the state (often to three-fourths the value of the crop), except in the counties of Madison, Henry, Benton, Hickman, Lincoln, Moore, Marshall, Williamson, Davidson, and Polk, where but a small portion of the laborers require advances, unless it be improvident negroes.

(11) *Lauderdale* and (24) *Tipton*: To negroes and small farmers; the former are supplied usually by the employer or on their own responsibility. (28) *Tipton*: It has been general, but we are having better times, and the people are getting out of debt and are more self-sustaining. (29) *Shelby*: All share hands go on credit; their crops are consumed before made. Improvidence, idleness, and whisky does this, and landlords are compelled to advance to them from the beginning. (46) *Haywood*: Has pre-

ailed to a great extent; more cash in the county now and credit not so much desired. (108) *McNairy*: The owner of the land gets a lien on the growing crop for supplies furnished. (132) *Franklin*: It is the custom of merchants to advance supplies to two-thirds the value of the growing crop. (168) *Williamson*: It is usual to let the negro laborer have enough to clothe and feed him comfortably; with whites, but little required. (172) *Rutherford*: Since 1875 the system has been greatly curtailed. The loss of credit resulting from a series of poor crops from 1872 to 1876, and the financial troubles of those years, have had an excellent effect upon the management of farm affairs.

41. At what stage of its production is the cotton crop usually covered by insurance? Is such practice general?

Cotton is not insured until ready for shipment and at the depot.

(76) *Weakley*: All the crop is not usually covered by insurance.

(108) *McNairy*: As soon as planted, if there are debts over the laborer.



42. What are the merchants' commissions and charges for storing, handling, shipping, insurance, etc., to which your crop is subject? What is the total amount of these charges against the farmer per pound, or 400-pound bale?

Commissions,  $2\frac{1}{2}$  per cent. Shipping, 25 cents per bale. Storage per month, 50 cents in Memphis and 25 cents per bale in Jackson and other places. Drayage, 25 cents per bale. Weighing, 10 cents per bale. The total cost is, with transportation, from \$3 to \$5 per bale, or three-fourths to 1 cent per pound. Cotton is, however, mostly sold from the wagon to merchants at home and these costs avoided. (9) *Lauderdale*: Fire insurance, 0.2 per cent.; river insurance, 0.4 per cent. per month. Total, five-eighths cent to Memphis and Saint Louis, three-fourths cent to

New Orleans, if sold soon; if kept longer, insurance is added.

(21) *Dyer*: 0.75 per cent. marine insurance; 1 per cent. fire insurance; total, including freight, etc., \$5.82 per bale, as shown by my accounts. It will average \$5. (59) *Madison*: Railroad and fire insurance, each 0.25 per cent. Total charges per bale to New Orleans, \$6 to \$7. (105) *McNairy*: Mobile merchants handle and pay freight at a cost of about 1 cent per pound. (177) *Rutherford*: 2 pounds dockage per bale; insurance, 25 cents.

43. What is your estimate of the cost of production in your region, exclusive of such charges and with fair soil and management?

The usual estimate is from 7 to 10 cents per pound; a few correspondents place it higher, others much lower. Some probably include all charges.

(14, 16) *Lauderdale*, (78) *Weakley*, (178) *Rutherford*:  $2\frac{1}{2}$  to 3 cents per pound. (2, 7) *Lake*, (8, 18) *Lauderdale*, (25) *Tipton*, (31) *Shelby*, (67) *Crossett*, (75) *Weakley*, (84) *Henry*, (96) *Henderson*, (113, 114, 116) *Benton*, (117, 123) *Decatur*, (146) *Giles*, (151, 152, 153) *Bedford*, (162) *Mauvy*, (167) *Williamson*, (171, 177) *Rutherford*, (187) *Davidson*: 4 to 5 cents per pound. A few estimate it at 6 cents per pound.

(51) *Haywood*: About \$15 to \$19 to make a bale of cotton, and about \$5 to \$6 to cultivate an acre of corn. (115) *Benton*: A good hand will make and gather 4 bales for about \$80. (116) *Benton*: The cost of producing 800 pounds of seed-cotton (yield of one acre), including wear of land, taxes, wear of tools, labor, etc., is about \$8, which, at  $2\frac{1}{2}$  cents per pound for seed-cotton, leaves a profit of \$12 per acre. If the land were manured the profit would be greater.

#### COST OF EACH ITEM OF LABOR AND MATERIAL EXPENDED IN THE CULTIVATION OF AN ACRE OF COTTON.

Items.	J. L. Lea, Lauderdale county.	R. L. Halliburton, Lauderdale county.	A. L. Pearson, Fayette county.	Aaron Walker, Haywood county.	A. D. Hurt, Madison county.	W. C. Price, Henderson county.	W. D. King, Humphreys county.	J. F. Anderson, Franklin county.	T. O. Abernathy, Giles county.	Rev. M. F. Thompson, Bedford county.	B. F. Jarrell, Bedford county.
Total.....	\$16 00	\$11 15	\$13 83	\$8 65	\$13 70	\$14 12	\$4 05	\$9 10	\$10 95	\$12 20	\$11 03
Rent.....	6 00	4 00	2 75	4 00		4 00	3 00	4 50	5 00	3 00	5 00
Fencing, repairs, and interest on.....	50	25	1 00	25	25	04			54	1 75	50
Knocking stalks.....	20	10	10		10	05	05		10	10	
Baling and burning stalks.....	00						05	20			
Other cleaning up.....		10	21			05			10		10
Listing.....	50	35			25				20		14
Breaking up.....		20	1 25	00		1 00	75			1 00	
Harrowing.....		15	25			20	10		10	10	
Barring old beds.....						20		1 00			
Splitting middles.....	50	15	21		13	20			20		25
Reversing.....	75		42								
Laying off.....	35	17	10		13	20	10		10	20	07
Manuring, home-made.....					5 00						
Applying manures.....					1 00	2 50		1 00			
Bedding up.....				50	50	1 00				80	
Splitting middles.....		15									
Knocking off beds.....	20			10		20					
Planting:											
Opening.....	20	10	10	15		33		45	10	20	12
Dropping.....	15	13	13		1 00				00	10	08
Covering.....	20	05	11						10	15	12
Seed.....	40	20	30	20	30	25		20	30	30	15
Thinning.....	00	75	75	1 00	50	1 25		50			50
Number of plowings.....	2 75	3 00	1 50	1 35	3 00	40		50	1 40	2 00	1 25
Number of hoeings.....	2 25		2 50		1 50	50		50	1 10	1 50	2 25
Hauling to gin.....	75	30	75	50	10	75		25	05	1 00	50
Management.....		1 00	1 40			1 00			1 50		
Not included in the above estimate:											
Picking, per hundred-weight.....	75	00	75	50	50	00		45	50	50	50
Ginning, per hundred-weight.....	1 00	18	70	1 00	80	23		40	22	20	20

REMARKS.—J. L. Lea: Cost of cultivating an acre of cotton, including team, feed, and tools, is about \$8. Some was cultivated at \$6. Average yield over half a bale of 500 pounds lint per acre. Cultivation of cotton has increased a little in ten years in excess of the amount of new clearing. A. L. Pearson: The original cost

of fencing is about \$2.50 per acre. The above estimate is on the basis of one-half bale of 500 pounds lint per acre and a selling price of  $10\frac{1}{2}$  cents per pound. The cultivation of cotton has increased in average and amount produced, owing to a vast increase of the number of white laborers entering the field.

---

N O T E

ON THE

COTTON PRODUCTION OF THE STATE OF KENTUCKY.

---

TABLE I.—AREA, POPULATION, AND COTTON PRODUCTION OF THE COTTON-PRODUCING COUNTIES OF KENTUCKY.

Cotton counties.	Land area.	POPULATION.						TILLED LAND.		COTTON PRODUCTION.					Cotton acreage per square mile.
		Total.	Male.	Female.	White.	Colored.	Average per square mile.	Acres.	Per cent. of area.	Acres.	Bales.	Product per acre.			
												Bale.	Seed-cotton.	Lint.	
Total for entire State....	Sq. mls. 40,000	1,048,690	832,590	816,100	1,877,179	271,511	41.2	8,367,010	32.7	.....	.....	.....	Lbs.	Lbs.	.....
Total for cotton counties.	13,910	655,557	320,349	326,208	546,575	108,982	47.1	8,036,894	34.1	2,667	1,367	0.51	729	243	0.2
CHIEF COTTON-PRODUCING COUNTIES.															
Calloway .....	450	13,295	6,617	6,678	12,080	1,215	29.5	75,450	20.2	316	165	0.52	744	248	0.7
Graves .....	590	24,138	12,359	11,770	21,287	2,851	40.9	143,037	37.9	869	417	0.48	684	228	1.5
Hickman .....	240	10,651	5,433	5,218	8,687	1,964	44.3	62,952	41.0	451	254	0.50	804	268	1.9
Fulton .....	200	7,977	4,076	3,901	6,371	1,603	39.9	43,584	34.0	549	300	0.55	780	260	2.7
Total .....	1,480	56,061	28,485	27,576	48,425	7,636	37.9	325,023	34.3	2,185	1,136	0.52	741	247	1.5
OTHER COTTON-PRODUCING COUNTIES.															
Allen .....	300	12,080	6,125	5,964	11,020	1,069	40.3	68,876	35.9	3	2	0.67	951	317	.....
Ballard .....	420	14,378	7,524	6,854	12,653	1,725	34.2	95,300	35.5	31	15	0.48	690	230	0.1
Barren .....	500	22,821	11,295	11,026	17,380	4,941	44.6	140,420	43.9	16	7	0.44	624	208	.....
Bell .....	160	6,055	3,073	2,982	5,874	181	31.0	24,480	20.1	2	1	0.50	714	238	.....
Bracken .....	200	13,509	6,900	6,543	12,093	816	37.5	88,716	30.3	10	5	0.50	714	238	0.1
Butler .....	370	12,181	6,103	6,018	11,361	820	32.9	76,280	32.2	2	1	0.50	714	238	.....
Christian .....	590	31,082	16,144	15,538	17,043	14,039	53.7	100,651	50.4	2	1	0.50	714	238	.....
Crittenden .....	420	11,088	5,966	5,782	10,537	1,151	27.8	77,265	28.7	11	4	0.38	519	173	.....
Daviess .....	450	27,730	14,230	13,500	22,876	4,854	61.6	154,698	53.7	8	9	1.13	1,002	534	.....
Edmonson .....	280	7,222	3,637	3,585	6,667	555	25.8	43,965	24.5	8	4	0.50	714	238	.....
Estill .....	300	9,800	4,989	4,871	9,349	511	32.8	35,765	18.6	8	2	0.25	357	119	.....
Floyd .....	500	10,176	5,112	5,064	9,977	190	20.4	40,068	12.5	12	2	0.17	237	79	.....
Green .....	300	11,871	5,986	5,885	9,463	2,408	30.6	70,885	30.9	2	1	0.50	714	238	.....
Henderson .....	450	24,515	12,646	11,869	16,943	7,572	54.4	135,223	47.0	21	9	0.43	612	204	.....
Jefferson .....	430	146,010	70,685	75,325	130,408	25,002	339.6	143,267	52.1	110	48	0.44	621	207	0.3
Laurel .....	620	9,131	4,595	4,536	8,864	267	14.7	48,140	12.1	3	1	0.33	474	158	.....
Letcher .....	300	6,601	3,403	3,198	6,459	142	22.0	28,561	14.9	2	2	1.00	1,425	475	.....
Livingston .....	280	9,165	4,672	4,493	8,130	1,035	32.7	69,405	38.8	2	1	0.50	714	238	.....
Logan .....	590	24,358	12,202	12,096	16,977	7,381	41.3	173,987	46.1	22	11	0.50	714	238	.....
McCracken .....	330	16,262	8,035	8,227	11,878	4,384	49.3	42,901	20.3	33	18	0.55	777	250	0.1
Magonia .....	300	6,044	3,540	3,404	6,794	150	23.1	35,915	18.7	4	4	1.00	1,425	475	.....
Marshall .....	350	9,647	4,870	4,777	9,207	440	27.6	59,306	26.5	23	10	0.43	621	207	0.1
Muhlenburgh .....	600	15,098	7,738	7,360	13,020	2,078	25.2	78,655	20.5	4	4	1.00	1,425	475	.....
Pendleton .....	400	16,702	8,580	8,122	15,922	780	41.8	89,637	35.0	12	9	0.75	1,068	356	.....
Pike .....	140	13,001	6,696	6,305	12,826	175	92.9	46,812	52.2	16	9	0.50	801	267	0.1
Pulaski .....	120	21,318	10,733	10,585	20,122	1,196	177.7	118,027	153.7	2	1	0.50	714	238	.....
Simpson .....	400	10,641	5,356	5,285	7,844	2,797	26.6	74,880	20.2	5	3	0.60	855	285	.....
Trigg .....	420	14,489	7,392	7,097	10,449	4,040	34.5	99,822	37.1	8	6	0.75	1,068	356	.....
Trimble .....	150	7,171	3,727	3,444	6,594	577	47.8	33,112	34.5	30	15	0.50	714	238	0.2
Warren .....	550	27,531	13,783	13,748	19,892	7,639	50.1	164,033	46.6	31	10	0.32	450	153	0.1
Wayne .....	430	12,512	6,156	6,356	11,613	899	29.1	81,013	29.4	36	14	0.39	555	185	0.1
Whitley .....	580	12,000	6,019	5,981	11,752	248	21.4	51,236	14.3	1	1	1.00	1,425	475	.....
Wolfe .....	190	5,638	2,826	2,812	5,563	75	29.7	30,510	25.1	2	1	0.50	714	238	.....
Total .....	12,430	599,496	300,864	298,632	498,150	161,346	48.2	2,711,871	34.1	482	231	0.48	684	228	.....

## COTTON PRODUCTION IN KENTUCKY

TABLE II.—ACREAGE AND PRODUCTION OF THE LEADING CROPS IN THE COTTON COUNTIES OF KENTUCKY.

Counties.	COTTON.		INDIAN CORN.		OATS.		WHEAT.		TOBACCO.	
	Acres.	Bales.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Pounds.
Total for entire State .....	2,667	1,367	3,021,176	72,852,263	403,416	4,580,738	1,100,108	11,356,113	226,120	171,120,784
Total for cotton counties .....	2,667	1,367	1,182,566	25,955,700	156,684	1,730,481	420,088	3,436,448	124,477	91,794,750
CHIEF COTTON-PRODUCING COUNTIES.										
Calloway .....	316	165	35,209	780,830	3,420	33,050	8,070	47,890	5,035	3,477,520
Graves .....	869	417	50,359	1,540,245	4,546	52,876	23,379	147,925	11,318	8,901,434
Hickman .....	451	254	28,302	784,828	880	13,857	14,290	107,006	658	401,946
Fulton .....	549	300	19,755	617,202	631	10,835	10,978	93,795	537	410,337
Total .....	2,185	1,136	142,631	3,728,114	9,486	110,618	56,729	396,616	17,548	13,251,237
OTHER COTTON-PRODUCING COUNTIES.										
Allen .....	3	2	31,578	401,279	6,869	56,821	10,505	46,848	283	100,352
Ballard .....	31	15	36,851	951,357	1,620	20,982	21,166	161,843	5,195	3,700,740
Barren .....	16	7	50,201	850,338	13,887	150,904	17,819	119,775	3,120	2,303,680
Bell .....	2	1	11,558	201,777	1,521	11,091	518	2,784	24	4,567
Bracken .....	10	5	21,025	562,550	705	9,715	13,435	179,979	7,159	6,120,035
Butler .....	2	1	34,579	651,593	7,271	88,583	5,800	32,513	1,052	1,030,020
Christian .....	2	1	60,724	1,430,154	4,981	64,341	40,247	437,038	18,475	12,577,574
Crittenden .....	11	4	37,706	848,900	3,608	37,022	7,295	48,221	2,368	1,047,936
Daviess .....	8	9	53,321	1,392,599	5,678	79,946	13,813	147,303	12,200	9,523,451
Edmonson .....	8	4	19,082	328,159	1,733	13,057	4,640	22,858	727	450,076
Estill .....	8	2	19,469	397,952	1,340	10,827	3,400	22,017	58	18,380
Floyd .....	12	2	21,351	420,298	2,501	15,072	2,750	18,356	73	1,845
Green .....	2	1	29,665	411,278	3,270	24,843	8,672	57,537	2,345	1,417,070
Henderson .....	21	9	55,038	1,680,007	1,781	27,589	9,832	124,091	12,468	10,312,631
Jefferson .....	110	48	38,757	1,056,209	8,056	114,793	15,825	186,212	26	11,632
Laurel .....	3	1	17,082	278,074	3,983	26,378	4,550	22,525	68	23,202
Letcher .....	2	2	11,175	215,547	1,141	8,804	1,640	10,622	23	2,007
Livingston .....	2	1	29,661	740,746	2,469	29,072	7,298	62,465	1,127	709,578
Logan .....	22	11	54,988	1,181,699	8,932	130,059	36,893	340,262	8,104	6,039,983
McCracken .....	33	18	20,542	483,776	2,850	30,077	8,814	64,540	3,377	2,410,825
Magoffin .....	4	4	13,751	267,726	3,004	20,643	2,180	14,801	73	11,404
Marshall .....	23	10	28,379	602,913	3,410	32,014	9,766	47,755	2,085	1,411,602
Muhlenburgh .....	4	4	35,798	652,279	7,814	100,340	9,698	63,874	3,856	2,731,716
Penitton .....	12	9	28,818	792,095	1,636	20,696	14,740	181,845	5,302	4,072,201
Pike .....	16	9	26,505	543,463	3,402	24,186	3,039	18,207	100	18,048
Pulaski .....	2	1	42,355	612,388	11,136	76,159	16,267	80,636	100	30,510
Shupson .....	5	3	29,778	579,055	6,132	86,700	18,267	117,010	2,240	1,608,053
Trigg .....	8	6	32,010	796,954	1,319	14,879	0,789	94,516	8,481	5,667,143
Trimble .....	30	15	13,135	281,183	2,199	25,390	5,505	66,027	2,070	1,658,307
Warren .....	31	10	67,177	1,495,419	14,448	204,000	21,173	150,750	3,505	2,605,388
Wayne .....	36	14	27,774	462,894	3,285	24,127	10,943	59,574	50	20,204
Whitley .....	1	1	24,802	300,420	3,001	20,417	4,472	17,054	10	3,498
Wolfe .....	2	1	12,756	261,896	2,745	18,518	2,514	16,935	50	29,520
Total .....	482	231	1,039,875	22,232,586	147,198	1,619,863	363,359	3,039,832	106,929	78,548,513

## COTTON PRODUCTION IN KENTUCKY.

Excepting a narrow strip of country in the western part of the state contiguous to Tennessee, Kentucky is hardly entitled to notice as a cotton-producing region. Tobacco takes the place of cotton, and is a leading crop, and even the area excepted might be claimed as naturally a part of Tennessee. This area lies between the Mississippi and the Tennessee rivers, in Fulton and the southern parts of Hickman, Graves, and Calloway counties, in an offset made at the expense of the sister state of Tennessee by the abrupt dropping southward between the rivers of the line separating the two states. Indeed, if, after reaching the Tennessee river in its course from the east, the boundary-line had continued directly on to the Mississippi, the cotton-producing strip would be a part of Tennessee and the latter state would have no notch in its northwestern corner to mar its symmetry. An inspection of the acreage map will show how this is. The relative importance of the fraction referred to as an area contributing to the total cotton product of Kentucky in 1879 is strikingly brought out when it is stated that of the total for the state, 1,367 bales, 1,136 were raised within this area, leaving only 231 to be accounted for. This strip indeed is the extreme northern limit of the cotton region in the eastern part of the Mississippi valley, the whole state of Kentucky, excepting this small fraction, being thrown into the penumbral region of cotton culture.

The entire area in Kentucky between the Mississippi and the Tennessee rivers, containing about 2,500 square miles, with an elevation above the sea of 280 feet along the river bottoms and 350 to 450 feet on the uplands, is based on strata of sands, calcareo-siliceous and loamy earths, with limited beds of clay and gravel, all but little consolidated, and belonging to geological formations (the uplands Quaternary and the lowlands "Recent") of comparatively modern age. These strata may be called "soft rocks", the Tennessee river being their eastern limit. Beyond this very different strata abruptly set in, "hard rocks" of solid limestone and other kinds, members chiefly of the far older sub-Carboniferous division of geologists.

The area in Kentucky between the rivers is but the northern end of a great belt of country, famous for its mellow, rich lands and as a cotton-producing region, that lies immediately east of the Mississippi river, mainly in the states of Mississippi and Tennessee. The belt begins on the west with the alluvial bottoms of the Mississippi (1 on the agricultural map). Proceeding eastward, and crossing the bottoms at any point, we are suddenly confronted with a bold, steep escarpment, or the "bluff", which, like a wall, reaches from southern Mississippi, through Tennessee, far into Kentucky. The bluff is touched by the Mississippi river at but few points: in Tennessee, at Memphis, Randolph, and Fulton; in Kentucky, at Hickman and Columbus. Ascending to the top of the bluff, 100 to 200 feet or more above the bottoms, we find ourselves upon a plateau country (2-6 on the agricultural map) which extends eastward for a long distance. This plateau country is the greater part of the belt. Its surface in Tennessee is divided longitudinally into three long sections or smaller belts: one on the west, with the bluff as its western limit; another to the east, rising up into a dividing summit between the waters of the Mississippi and the Tennessee rivers; and a third intermediate and wider one. These sections extend into Kentucky with their characteristic strata and soils, the western and middle (2 and 3 on the map) the more extensively. The western section is from 10 to 30 miles wide. Its soils are based upon a remarkable bed of very fine siliceous earth, containing more or less calcareous matter, and called, in the language of geologists, *loess*. There is much of this formation in Fulton, Hickman, Ballard, and other counties in the part of Kentucky west of the Tennessee river. The middle section or sub-belt has in Tennessee brown, loamy, mellow soils, based on sandy strata, fertile and important, which also occur in Kentucky. These, with the soils of the loess, spread over the region between the rivers, and together make the warm lands—of easy tillage, highly productive of tobacco, and enticing cotton culture, in spite of climate—within their area. The loess of this region is thus spoken of by D. D. Owen in one of his first reports on the geology of Kentucky:

The most conspicuous and frequently occurring beds of the Quaternary is a very fine calcareo-siliceous earth of pale reddish-gray or ashen-flesh tint. This imparts character to the soil where the Quaternary formations exist more frequently than any of the other

beds, and it gives rise to some of the best tobacco land. Its usual constituents may be seen from the following chemical analysis of a specimen taken from the great cut of the Mobile and Ohio Railroad near Columbus, in Hickman county:

	Per cent.		Per cent.
Combined moisture .....	1.35	<i>Analysis of the insoluble silicates.</i>	
Organic matter soluble in water .....	0.30		
Insoluble silicates .....	73.30	Silica .....	60.6
Carbonic acid .....	10.00	Alumina .....	7.4
Lime .....	6.80	Lime .....	1.1
Magnesia .....	3.78	Magnesia .....	0.4
Alumina and peroxide of iron .....	2.80	Loss, alkalis and trace of iron not estimated .....	3.8
Chlorine .....	0.12		
Loss, and alkalis not determined .....	1.55		
	<u>100.00</u>		<u>73.3</u>

Its calcareous matter is derived, in a great measure, from the land and fresh-water shells, often abundantly disseminated through it, sometimes in a good state of preservation, but oftener in a very soft and tender condition, so that they crumble to pieces as soon as touched. Calcareous concretions are not unfrequently disseminated through this earth in considerable abundance, formed by the percolation of water charged with carbonic acid, which, dissolving the calcareous matter in the upper part of the deposit, carries it by filtration to the lower part of the bed, redepositing it in the form of hard masses, which not unfrequently envelop the same shells in a very perfect condition. This is also the most superficial bed of the Quaternary deposits, as it is generally reached immediately after passing through the subsoil. It has a thickness of from 30 to 40 feet, and rests generally in southwestern Kentucky on gravel chiefly composed of brown hornstone and chert, derived from the sub-Carboniferous strata.

The reader, desiring further information as to loess soils, is referred to the report on Mississippi, in which there is a discussion of them by Professor Hilgard.

The alluvial belt of the Mississippi river supplies fine areas of tillable lands, in some parts of which, in Fulton county especially, cotton is cultivated to a greater or less extent. Such are the lands of Madrid Bend and the "front-lands", extending for miles along the river from the town of Hickman to the Tennessee line. Cotton, however, is chiefly raised upon the uplands.

Table I gives the population and the cotton production of the counties designated as cotton-producing, and in which, substantially, the cotton reported as the yield of the state in 1879 was raised. Their total product is 1,136 bales of 475 pounds each. The yield per acre is high—0.52 per cent. of a 475-pound bale, or 741 pounds of seed-cotton. The increase in total products over that of 1869 is, after making the proper reduction, 67½ per cent. The negroes form about 14 per cent. of the total population.

Of the other counties in the Quaternary region, Ballard produced, in 1879, 15 bales; McCracken, 18; and Marshall, 10; making for the entire region 1,179 bales, and leaving only 188 bales for the remainder of the state.

In the counties east of the Tennessee river the cotton patches of 1879 were scattered in a remarkable manner over its area, as may be seen on the acreage map. Some of them occupy anomalous positions. One occurs in Bracken county and two in Trimble county, in the northern part of the state, and not far from Cincinnati. Jefferson reports a product of no less than 48 bales. Thirty-one counties east of the Tennessee produced varying amounts, none reporting less than a bale being included.

With such a scanty product of cotton as we have in this part of Kentucky, any discussion of the soils with reference to cotton-growing would not be pertinent, and could have no practical bearing. It is especially in relation to tobacco-growing that such discussions would be in place.



# INDEX TO COTTON PRODUCTION IN TENNESSEE AND KENTUCKY.

A.		Page.		Page.
Abernathy, J. E., abstract of the report of .....	35, 81	Bales per acre in counties (table) .....	3-5	
Abernathy, T. O., abstract of the report of .....	81	hand, usual estimate of .....	104	
Abstracts of the reports of correspondents ( <i>see also</i> regional descriptions) .....	48-92	square mile in the regions .....	40	
Accidents of weather, effect of, on cotton .....	102	usual weight of .....	102	
Acres and production of cotton in Kentucky (tables) .....	109, 110	Baling, ginning, and shipping cotton, details of .....	101, 102	
leading crops in Kentucky (table) .....	110	Banner counties in cotton production in the state and region (table) .....	41	
Tennessee (table) .....	6-8	Barrens formerly an open prairie .....	26	
Acres per hand, usual estimate of .....	104	lands of the Highland Rim, description of .....	26	
Addresses and names of correspondents .....	94-96	of Lincoln county .....	82	
Advances to laborers on growing crop .....	104	Humphreys county .....	74	
After-cultivation of cotton .....	99, 100	McNairy county .....	67	
Agricultural descriptions of the cotton-producing counties ..	45-92	Weakley county .....	62	
Akin, J. F., abstract of the report of .....	71, 72	Batten, W. S., abstract of the report of .....	88	
Akin, R. J., abstract of the report of .....	71, 72	Bedford county, statistics and description of .....	82, 83	
Akin, W. R., abstract of the report of .....	71, 72	Beds of dark, stratified sands and clays, description of .....	58	
Allison, D. R., abstract of the report of .....	59	Beech river, description of .....	71	
Allison, R. C., abstract of the report of .....	83	Benton county, Mississippi, analyses of soil and subsoils of ..	20	
Allison, T. F. P., abstract of the report of .....	86	statistics and description of .....	69, 70	
Alluvial lands of the Tennessee river .....	24	Big Sandy River bottom lands, description .....	70	
Alston, J. J., abstract of the report of .....	51	Blackburn, J. K. P., abstract of the report of .....	82	
Amount of charges against the farmer for sale of cotton .....	105	Black frost, first appearance of .....	100	
Analyses of brown-loam table-land .....	20	prairie belt of West Tennessee .....	21, 22	
Mississippi bottom soils .....	16	Blight as affecting cotton .....	103	
mulatto clay lands of the Central Basin .....	32	Bluff escarpment, at what points it strikes the river .....	14	
poplar lands of the Central Basin .....	31	of the Mississippi river in Kentucky .....	111	
red-clay lands of the Central Basin .....	30	or plateau slope, elevation and water courses of .....	16, 17	
soils and subsoils (tables) .....	16, 18, 20, 30-33, 44	of West Tennessee, area, extent, general character, and subdivisions of ..	16-23	
the bluff and loess region .....	18	region, general characters of .....	17-19	
Analysis of loess land of Kentucky .....	112	Boggan, W. H., abstract of the report of .....	71, 72	
Anderson, Dr. H. C., abstract of the report of .....	57	Bohannon, E. T., abstract of the report of .....	20, 65	
Anderson, J. F., abstract of the report of .....	27, 28, 36, 79	Bolling favored by application of manure .....	52, 58, 61, 71, 76, 92	
Anderson, R. D., abstract of the report of .....	69	close plowing to cut lateral roots ..	50-54, 58, 59, 62, 65-67, 83, 84	
Anderson, W. H., abstract of the report of .....	48	deep plowing in preparation of the land ..	81	
Area (land and water) of the state .....	11	early planting .....	52, 56, 57, 66, 81, 90	
of brown-loam table-lands .....	19	planting the seed thick in the drill .....	81	
counties of Tennessee (table) .....	3-5	rapid culture and early laying by .....	52	
Kentucky cotton counties (table) .....	109	reducing the ridge .....	88	
region .....	111	rolling the seed in plaster and planting early .....	87	
regions of Tennessee .....	13, 14	running no center furrow when bedding ..	52	
summit region of the water-shed of the Tennessee ..	21	shallow cultivation .....	48, 51, 55, 57, 60, 68, 81, 88, 91	
the Cumberland table-land .....	35	thinning the stalks .....	73	
B.		topping the plant .....	50, 52, 60-65, 67, 68, 70-73, 76, 78, 79, 84, 85, 90	
Back-lands of Decatur county, description of .....	71	turning out the middles .....	76	
Shelby county .....	53	Bolls first open on cotton-plants, when .....	100	
the Tennessee valley .....	24	Boll-worm, appearance of .....	102	
Bagging used in baling cotton .....	102			
Bales, average number of, per acre in counties (table) .....	3-5			
of lint, amount of seed-cotton required for ( <i>see</i> abstracts in county descriptions) .....	48-92			

# 114 INDEX TO COTTON PRODUCTION IN TENNESSEE AND KENTUCKY.

	Page.		Page.
Boon, J. J., abstract of the report of.....	58	Cotton farms worked on shares .....	104
Bottom lands of the bluff region .....	17	growing, season of.....	12, 13
soils of the brown-loam table-lands.....	19	region, as influenced by elevation and tem-	
Bowden, B. D., abstract of the report of .....	64	perature .....	12, 13
Boyd, E., abstract of the report of .....	92	lint, total tons of, in regions (table) .....	40
Bradford, R. S., abstract of the report of .....	48	plant, height of, before blooming ( <i>see</i> abstracts in	
Brantly, J. B., abstract of the report of .....	20, 57	county descriptions).....	48-92
Bridges, J. H., abstract of the report of.....	70	tendency of, to run to weed, and how obviated.	
Brittain, J. F., abstract of the report of.....	84	( <i>See</i> under Soils.)	
Broadwell Brothers, abstract of the report of.....	87	usual height of ( <i>see</i> abstracts in county descrip-	
Brown-loam table-lands, county descriptions of.....	54-62	tions) .....	48-92
region, area, extent, and character of .....	19-21	production, amount of, on the brown-loam table-	
Bruce, R., abstract of the report of .....	88	lands .....	19
Bryant, Z., sr., abstract of the report of.....	20, 61	cost of, per pound.....	105
Buckshot clays and soils of the Mississippi, character of.....	15	cultural and economic details of.....	93-105
description of. ( <i>See</i> under Soils.)		decreases as tobacco-growing increases ..	40
high productiveness of.....	16	discussion of, by regions .....	41, 42
Butler, G. C., abstract of the report of .....	58	east of the Tennessee river in Kentucky,	
		scattered in patches.....	112
C.		general remarks on .....	40-43
Calcareous clay lands of the Highland Rim, description of ..	26	in counties of Kentucky (table) .....	109
shale and valley lands of East Tennessee.....	38	increase of, in Kentucky, over 1869 .....	112
Capacity of presses used in baling cotton.....	101	Tennessee since 1870 .....	43
Carnes, A. R., abstract of the report of .....	65	itemized cost of (table).....	105
Carroll county, statistics and descriptions of.....	64, 65	of counties, in bales (tables) .....	3-8
Carter's Creek limestone, description of.....	90	Cumberland table-lands.....	36
lands of Central Basin, extent and		East Tennessee valley.....	38
description of.....	30	the Highland Rim .....	25
Caterpillar, appearance of, and how obviated .....	102, 103	penumbral region of.....	23, 25, 38, 78, 92
Cavitt, J. F., abstract of the report of.....	63	percentage of, in regions .....	40
Cedar glades of the Central Basin, area and character of.....	28-30	relations of, to isotherms .....	40
( <i>see</i> Central Basin counties).....	80-91	the races .....	42
growth in the Central Basin.....	29	remarks on, in Kentucky.....	111, 112
roughs and glades in Marshall county, description of..	83	the extreme northern limit of, and to	
Central Basin, analyses of lands of.....	31, 32	what circumstance chiefly due .....	40
bounded by high escarpments .....	28	two chief regions of.....	40
cotton production of .....	41	product per acre, comparison of, in regions (table) ..	40
county descriptions of.....	80-91	in counties of Tennessee (table)....	3-5
depth of, below surrounding highlands .....	28	Kentucky (table).....	109
limestones, description of.....	83	of bluff region .....	17
originally covered with cane .....	28	on any soil and on fresh and old	
region, area, extent, and character of.....	28-35	land. ( <i>See</i> under Soils, or in ab-	
the most populous portion of Tennessee, and		stracts from reports in the county	
one of the centers of cotton production .....	28	descriptions.)	
limestone lands of the Central Basin, description		rating of ( <i>see</i> abstracts in county descriptions).....	48-92
and analyses of .....	29, 30	region of Kentucky, area, location, and extent of ..	111
Chapel Hill red lands, character of .....	83	shipments ( <i>see</i> abstracts in county descriptions).....	48-92
Chickasaw bluffs of the Mississippi.....	14	soils, most important, from what geological horizon	
Churchman, D. C., abstract of the report of .....	50	derived .....	13
Clark, R. S., abstract of the report of.....	27	staple, rating of ( <i>see</i> abstracts in county descriptions) ..	48-92
Clarke, H. M., abstract of the report of.....	57	ties, rope used for, in Polk county .....	102
Claybrooke, J. S., abstract of the report of .....	34, 86	Cottonseed-cake used as feed or manure.....	98
Climate of the state presents a marked variety .....	12	disposal of.....	43, 98
Close of cotton-picking season .....	100	planters, efficacy of .....	99
Coahoma county, Mississippi, analysis of soil of.....	16	total of, in tons, in regions (table).....	40
Collins, M. P., abstract of the report of.....	59	value of, as a fertilizer .....	98
Combs, J. G., abstract of the report of .....	68	variety and amount of, used per acre .....	99
Commissions of merchants for sale of cotton.....	105	Counties, agricultural descriptions of.....	45-92
Conditions imposed by transportation companies.....	102	having the highest total cotton production and	
Corn, acreage and production of, in Kentucky (table) .....	110	highest product per acre (table).....	41
Tennessee (table) .....	6-8	in the alluvial plain of the Mississippi river .....	47
Correspondents, names and addresses of .....	94-96	brown table-lands .....	54
Cost, itemized, of cotton production (table) .....	105	Central Basin.....	80
Cotton acreage per square mile.....	40	Highland Rim (eastern subdivision).....	78
in Kentucky counties (table).....	109	(western subdivision) .....	75
Tennessee (table) .....	3-5	western valley of the Tennessee river.....	69
bales and acres of, in each county (tables).....	3-8	of the bluff region .....	16
per square mile (table) .....	40	brown-loam table-lands .....	19
blooms first appear and bolls first open, when.....	100	Central Basin .....	28
culture, methods of .....	42, 43	Cumberland table-land .....	35, 92
percentage of tilled land devoted to (table).....	3-5	East Tennessee valley .....	37, 92

	Page.		Page.
Counties of the Highland Rim .....	25	Elevations of the Unaka Mountain region .....	39
Mississippi alluvial (in part) and bluff region .....	14, 49	Elk Ridge region of the Central Basin, description of .....	28, 83, 84
summit region of the water-shed of the Tennessee .....	21, 63	Ellis, J. M., abstract of the report of .....	92
Unaka Mountain region .....	39, 92	Enumeration, tabulated results of the .....	1-8
Cravens, S. C., abstract of the report of .....	62	Exum, M. V. B., abstract of the report of .....	59
Crawley, L. D., abstract of the report of .....	24, 71	Ezell, J. B., abstract of the report of .....	33, 84
Credit system, prevalence of .....	104		
Crockett county, statistics and description of .....	60	<b>F.</b>	
Crops, acreage and production of, in each county of Tennessee (see table) .....	5-8	Fall plowing and its results .....	97
Kentucky (table) .....	110	remarks on .....	43
best suited to the soils (see abstracts in county descriptions) .....	48-92	Fallowing and its results .....	97
of the valley of the Tennessee .....	24	Farms, usual size of .....	103
Highland Rim .....	26	Farnsworth, A. H., abstract of the report of .....	67
rotation of, remarks on .....	42	Fastening used in baling cotton, kinds of .....	102
Cultivation and planting of cotton, details of .....	99, 100	Fayette county, statistics and description of .....	54, 55
Cultural and economic details of cotton production .....	93-105	Features, variety of, in the state .....	11
Cumberland table-lands, area, extent, elevation, and character of .....	12, 35, 36	Feed, cottonseed-cake used as .....	98
county descriptions of .....	92	Fertilizers, remarks on the prevalent use of .....	43
rich limestone declivities of .....	36	Fertilizing and green-manuring .....	98
terrace along slopes of .....	36	Flatwoods belt of West Tennessee .....	21
Cunningham, E. W., abstract of the report of .....	22, 66	of Highland Rim .....	26
Cut-worm, appearance of .....	102	Flowers, J. H., abstract of the report of .....	51
		Fowler, J. W., abstract of the report of .....	45
<b>D.</b>		Franklin county, statistics and description of .....	79
Darnall, R. M., abstract of the report of .....	48	Freight rates of shipment (see county descriptions) .....	47-92
Davidson county, analyses of soil and subsoil of .....	31, 32	Frierson, J. W., abstract of the report of .....	85
statistics and description of .....	88, 89	Frierson, L., abstract of the report of .....	33, 85
Davis, C. M., abstract of the report of .....	66	Front-lands of Decatur county; description of .....	71
Davis, Dr. J. W., abstract of the report of .....	33, 88	Shelby county .....	53
Davis, W. C., abstract of the report of .....	90	Tennessee alluvial region .....	24
Decatur county, statistics and description of .....	70	the Mississippi river .....	14, 15
Depth of tillage .....	97	Frosts chiefly feared by cotton producers .....	40
Details, cultural and economic, of cotton production .....	93-105	time of, in different parts of the state .....	12, 13
Diagram showing the natural divisions of the state .....	11	Fryer, Dr. W. S., abstract of the report of .....	64
Diseases, insect enemies, etc., of cotton, occurrence of, and to what attributed .....	102, 103		
Divide, description of lands along the .....	63	<b>G.</b>	
Divisions, natural and political, of the state .....	12-14	Gallaway, J. M., abstract of the report of .....	54, 55
which coincide in general level .....	12	Geological formation (see county descriptions) .....	47-92
Dobbins, S. C., abstract of the report of .....	63	horizon of the most important cotton soils .....	13
Donaldson, L., abstract of the report of .....	48	Geology of the cotton region of Kentucky .....	111
Donelson, W. A., abstract of the report of .....	89	Gibson county, statistics and description of .....	61
Donelson, W. S., abstract of the report of .....	89	Giles county, statistics and description of .....	80-82
Douglass, H. L., abstract of the report of .....	18	Ginning, baling, and shipping cotton, details of .....	101, 102
Doxey, S. R., abstract of the report of .....	34, 91	Gins, cotton, list and capacity of .....	101
Draft employed in breaking up land .....	97	Glades of the western valley of the Tennessee .....	23
Drainage of lands (see abstracts in county descriptions) .....	48-92	or bald places in the prairie belt .....	22
Drayage of cotton, cost of .....	105	Glass, P. T., abstract of the report of .....	51
Driver, S. P., abstract of the report of .....	52	Glenn, W. B., abstract of the report of .....	84
Dyer county, statistics and description of .....	50	Gooch, J. S., abstract of the report of .....	88
Dyer, R. J., abstract of the report of .....	67	Gordon, W. O., abstract of the report of .....	34, 85
		Graham, J. M., abstract of the report of .....	27, 78
<b>E.</b>		Gray, B., abstract of the report of .....	34, 89
Earheart, P., abstract of the report of .....	89	Gray belt of East Tennessee valley, character and soils of .....	37, 38
East Tennessee a fluted region .....	13	Green, J. A., abstract of the report of .....	92
cotton production in .....	42	Green, J. U., abstract of the report of .....	52
valley, a penumbral cotton region .....	38	Green-manuring and fertilizing .....	98
gray and red belts and cherty dolomite knobs of .....	37, 38	Greensand, occurrence of .....	21, 22, 66, 68, 72
ridges and streams of .....	36, 37		
Economic and cultural details of cotton production .....	93-105	<b>H.</b>	
Edmonson, J. S., abstract of the report of .....	81	Halliburton, R. L., abstract of the report of .....	51
Elevation of the cotton region of Kentucky .....	111	Hamilton county, description of .....	92
Elevations of bluff or plateau region of Tennessee .....	17	Hammontree, Dr. S., abstract of the report of .....	53
Cumberland table-land .....	35	Hampton, M. D., abstract of the report of .....	82
Tennessee Valley region .....	23	Harbert, E. C., abstract of the report of .....	59
the regions .....	13, 14	Hardeman county, statistics and description of .....	55, 56
state .....	11	Hardin county, divisions and varied features of .....	72
		statistics and description of .....	72
		Harris, A., abstract of the report of .....	50
		Harris, Dr. R. B., abstract of the report of .....	88
		Hatchie bottom soil, description of .....	51
		Hays, J. W., abstract of the report of .....	61
		Haywood county, statistics and description of .....	56, 57

	Page.
Height attained by cotton before blooming .....	100
of cotton plant ( <i>see</i> abstracts in county descriptions) .	48-92
Henderson county, statistics and description of .....	66, 67
Henry county, statistics and description of .....	63, 64
Herring, B. W., abstract of the report of .....	18, 49
Hickman county, statistics and description of .....	77, 78
Highland Rim, a "penumbral" region in cotton production .	25, 78
region, area, extent, and character of .....	14, 25-28
cotton production of .....	41
county descriptions of .....	75, 80
Hilgard, E. W., discussion of analyses by .....	16, 20, 30, 33
Hill, Dr. W. H., abstract of the report of .....	52
Hillside ditching ( <i>see</i> abstracts in county descriptions) .....	48-92
Hilsman, B. T., abstract of the report of .....	65
Hollis, N. M., abstract of the report of .....	27, 76
Horizontalizing ( <i>see</i> abstracts in county descriptions) .....	48-92
Humphreys county, statistics and description of .....	74
Hurt, A. D., abstract of the report of .....	20, 58, 59
Hurt, W. B., abstract of the report of .....	51
Hyde, Dr. H. B., abstract of the report of .....	86

**I.**

Implements used in after-cultivation of cotton.....	99, 100
cotton planting.....	99
Improvement, tillage, etc .....	97, 98
Ingram, T., abstract of the report of.....	58
Insect enemies, diseases, etc., of cotton, occurrence of, and to what attributed .....	102, 103
Insurance on cotton, practice of and charges for .....	104, 105
Iron ties for baling cotton .....	102
Irwin, J. W., abstract of the report of.....	25, 73
Isbell, G. W., abstract of the report of .....	62
Islands of the Mississippi river.....	14, 52
Isotherms as related to cotton production .....	13, 40
Issaquena county, Mississippi, analysis of soil of.....	16

## J.

Jaffa, M. E., analysis of soil by .....	33
James county, description of .....	92
Jarrel, B. F., abstract of the report of .....	83
Johnson, W., abstract of the report of .....	65
Johnson, W. L., abstract of the report of .....	86
Jordan, J. H., abstract of the report of .....	22, 65

## K

Keith, J. Y., abstract of the report of.....	58
Kentucky loess, occurrence, character, and analysis of.....	111, 112
Kerr, J. W., abstract of the report of.....	57
King, W. D., abstract of the report of.....	74
Knox shale group of East Tennessee.....	32

**I.**

Labor and system of farming.....	103-105
Laborers, condition of.....	104
nationality of, and wages paid to.....	43, 104
Lackey, I. A., abstract of the report of.....	51
Lake county, statistics and description of.....	47, 48
Lands lying "turned out", proportion of (see abstracts in county descriptions).....	48-92
preparation given to, before planting cotton.....	99
tilled, of counties (table).....	3-5
Lankford, T. N., abstract of the report of.....	65
Lauderdale county, statistics and description of.....	50, 51
Lawrence county, statistics and description of.....	75, 76
Lea, J. L., abstract of the report of.....	15, 51, 105
Leek, M. M., abstract of the report of.....	89
Length of the state.....	11
Letters of transmittal.....	iii
Lewis, A. D., abstract of the report of.....	54
Lewis county, statistics and description of.....	76, 77
Lice (aphides), appearance of.....	102
Limestone lands of certain valleys of East Tennessee.....	38

	Page.
Limestone of Carter's creek, Central Basin, character and thickness of .....	30
Lincoln county, statistics and description of .....	82
Lindsay, J. J., abstract of the report of .....	81
Lint, average product per acre of, in counties (table) .....	3-5
Lipscomb, J. C., abstract of the report of .....	20, 62
Loess of Hickman county, Kentucky, analysis of .....	112
the bluff region of Tennessee, analysis of .....	18
Long, T. C., abstract of the report of .....	59
Lord, F. A., abstract of the report of .....	57
Low, E. E., abstract of the report of .....	56

#### IV.

McDowell, J. H., abstract of the report of .....	18, 49
McElroy, A. M., abstract of the report of .....	88
McMillan, J., abstract of the report of .....	24, 71
McMurry, L. P., abstract of the report of .....	61
McNairy county, statistics and description of .....	67-69
McNatt, P. B., abstract of the report of .....	67
Madison county, statistics and description of .....	57-59
Magnesian limestone lands of East Tennessee.....	38
Maiden, W. R., abstract of the report of .....	70
Manson, J. A., abstract of the report of .....	56
Manure, cottonseed-cake used as .....	98
Market value of land .....	104
Marley, J. C., abstract of the report of .....	15, 51
Marshall county, statistics and description of .....	83, 84
Martin, J. G., abstract of the report of .....	91
Martin, T. D., abstract of the report of .....	62
Mason, J. G., abstract of the report of .....	81
Mason, W. N., abstract of the report of .....	88
Maury county, analyses of soil and subsoil of .....	31
statistics and description of .....	84, 85
Mechanical analysis of mulatto clay subsoil of the Central Basin .....	33
Meeks, J. H., abstract of the report of .....	68, 69
Melton, P. M., abstract of the report of .....	70
Metamorphic character of the Unaka mountains.....	39
Methods of cotton culture, remarks on .....	42, 43
Miller, F. E., abstract of the report of .....	23, 69
Mississippi, analyses of soils from .....	16, 20
bottom and bluff region, description of counties of .....	49-54
lands of Kentucky .....	112
region, area, extent, and description of..	14-16
bluff escarpment of .....	14
cotton production of .....	41
front-lands of .....	14
Mississippi bottom, tilled area of .....	15
Mitchell, J. C., abstract of the report of .....	24, 25, 72, 73
Mixed farming and planting, custom of .....	103
Mulatto lands of Nashville series, character, extent, and analyses of .....	32
Murphy, J. S., abstract of the report of .....	49

**N.**

Natural divisions of the state .....	13, 14
Neal, P. M., abstract of the report of .....	60
Negroes owning lands, etc .....	43, 104
relations of, to cotton production .....	42
Nelson, D. M., abstract of the report of .....	88
Nelson, Professor J., abstract of the report of .....	57
Nelson, W. H., abstract of the report of .....	19
Number of cotton pickings made .....	100

Oats, acres and production of, in Kentucky (table).....	110
Tennessee (table).....	6-8
Obion county, statistics and description of .....	49
Oldham, E. R., abstract of the report of .....	51
Old shore-line, description of .....	70-72
Orange-sand drift, occurrence of .....	23

Orbis limestone bed, character and thickness of.....	31
lands of the Central Basin, extent, character, soils, and growth of.....	31
Osier, S. M., abstract of the report of.....	58
Outlines of the physical geography of the state of Tennessee.....	11-40
Owen, D. D., remarks of, on the loess of Kentucky.....	111, 112
Owen's geological report of Kentucky, extract from.....	26

# P.

Paris green used as a remedy against the caterpillar.....	102, 103
Parker, J. F., abstract of the report of.....	51
Parks, S., abstract of the report of.....	50
Pate, C. H., abstract of the report of.....	50
Patterson, G., abstract of the report of.....	20, 62
Patterson, J. N., abstract of the report of.....	81
Peacock, C. M., abstract of the report of.....	48
Pearcy, J. H., abstract of the report of.....	24, 71
Pearson, A. L., abstract of the report of.....	54, 105
Pearson, J., abstract of the report of.....	66
Pearson, J. D., abstract of the report of.....	59
Penumbral regions of cotton production.....	23, 25, 38, 78, 92
Perkins, S., abstract of the report of.....	86
Perry county, statistics and description of.....	73, 74
Picking cotton begins and closes, when.....	100
Piney valley, character of.....	77
Planting and cultivation of cotton, details of.....	99, 100
mixed farming, custom of.....	103
Plateau slope of Carroll county, Tennessee.....	64
Kentucky.....	111
West Tennessee, area, extent, subdivisions, and general character of.....	16-23
cotton production of.....	41
Plunk, S., abstract of the report of.....	23, 69
Pointer, S. A., abstract of the report of.....	34, 87
Political divisions of the state.....	12
Polk county, description of.....	92
Polk, H. M., abstract of the report of.....	21, 55
Polk, L. E., abstract of the report of.....	34, 35, 85
Polk, O. B., abstract of the report of.....	55
Pontotoo ridge of Mississippi.....	21
Poplar lands of the Central Basin, extent, character, growth, and analyses of.....	31, 32
Population, average, per square mile, of counties (table).....	3-5
Post-oak flatwoods.....	72
Power used in ginning cotton.....	101
Preparation of cotton land.....	99
Presses used in baling cotton.....	101, 102
Presson, A. C., abstract of the report of.....	24, 70
Price of cottonseed.....	98
Production of leading crops in Kentucky (table).....	110
Tennessee (table).....	6-8
Proportion of negro laborers owning land or houses.....	104

# Q.

Questions, schedule, summary of answers to.....	97-105
---	--------

# R.

Rainfall in the state.....	13
Rank of banner counties in the state.....	41
Ransom, B. F., abstract of the report of.....	33, 83
Ransom, W. R., abstract of the report of.....	83
Rating of the staple (see abstracts in county descriptions).....	48-92
Read, E. J., sr., abstract of the report of.....	60
Red belt of East Tennessee valley, character and soils of.....	37, 38
clay lands of Central Basin, analyses of.....	30
Highland Rim.....	26, 79
Reference table of reports received from Tennessee counties.....	94-96
Region, description of:	
bluff.....	17-19
brown-loam table-lands.....	19-21
Central Basin.....	28-35
Cumberland table-land.....	35, 36

# Region, description of—continued.

Highland Rim.....	25-28
Mississippi bottom.....	14-16
summit, of the water-shed.....	21-23
Unaka Mountain.....	39, 40
upland or plateau slope, of West Tennessee.....	16-23
valley, of East Tennessee.....	36-39
western valley, of the Tennessee river.....	23-25
Regions, outlines, areas, and elevations of.....	13, 14
cotton production of (tables).....	40, 41
Relations of cotton production to the races.....	42
Remarks on cotton production in Tennessee.....	40-43
Rent of land.....	104
Reports received from Tennessee counties, reference table of.....	94-96
Reynolds, D. T., abstract of the report of.....	35, 81
Rice, F. T., abstract of the report of.....	18, 51
Ridges and ridge and cherty lands of East Tennessee.....	37, 38
Rivers, J., abstract of the report of.....	81
Rivers, W., abstract of the report of.....	35, 81
Roane, Dr. T. W., abstract of the report of.....	52
Robbins, A., abstract of the report of.....	64
Rocks and soils, general remarks on.....	13
hard, greater part of state made up of.....	13
of the highlands, description of.....	77
soft, cover western part of the state.....	13
strata of, position and outcrop of.....	13
Rogers, F. G., abstract of the report of.....	67
Rope used as cotton-ties in Polk county.....	102
Rotation of crops.....	42, 97, 98
Rot of bolls, occurrence of.....	102
Rowsey, J. H., abstract of the report of.....	69
Rush, W., abstract of the report of.....	56
Rust or blight, occurrence of, on heavy or ill-drained soils.....	103
Rutherford county, agricultural areas of, arranged symmet- rically.....	87
analyses of soils and subsoils of.....	30
statistics and description of.....	87, 88

# S.

Saint Louis limestone formation.....	26, 39, 79
Sanders, A. H., abstract of the report of.....	88
Sandy pine and oak uplands of West Tennessee.....	21, 22
Schedule questions, summary of answers to.....	97-105
Scott, D. M., abstract of the report of.....	72
Seed-cotton, amount of, required for a 475-pound bale of lint.....	48-92, 101
penned, or how protected.....	100
product per acre in counties (table).....	3-5
Senter, J. M., abstract of the report of.....	61
Sequatchie valley, extent and description of.....	35, 39
Shares, working cotton farms on, effect of, on land and staple.....	104
Shaw, J. M., abstract of the report of.....	57
Shedding of cotton-bolls, occurrence of.....	102
Shelby county, analyses of soils of.....	17, 18
statistics and description of.....	53
Shinault, J. H., abstract of the report of.....	18, 52, 53
Shipping, ginning, and baling cotton, details of.....	101, 102
of cotton and charges for.....	105
rates of (see county descriptions).....	47, 92
Siliceous lands of the Highland Rim, description of.....	26
Silurian limestones (Nashville series), extent, thickness, and soils of.....	32
Simmons, R. T., abstract of the report of.....	71, 72
Sloan, J. F., abstract of the report of.....	65
Smallwood, W. P., abstract of the report of.....	22, 64
Smith, A. W., abstract of the report of.....	53
Smith, H., abstract of the report of.....	91
Smith, J. W., abstract of the report of.....	88
Smyth, A. M., abstract of the report of.....	62
Soils, character, tilling qualities, and productiveness of:	
black-jack ridge land.....	59

	Page.		Page.
Soils, character, tilling qualities, and productiveness of—		Subsoiling, implements used in .....	97
continued.		Subsoils and soils, analyses of (tables) .....	16, 18, 20, 30-33, 44
limestone lands of Central Basin .....	89	character of ( <i>see</i> abstracts in county descriptions) ..	48-92
sandy bottom land of Tennessee river .....	73	Summary of answers to schedule questions .....	97-105
uplands .....	70, 72, 89	Summit region of the water-shed, county descriptions of ..	63-69
brown clay loam lowlands .....	66	extent and character of ..	21-23
gravelly flint land .....	81	Sumner county, statistics and description of .....	90, 91
mahogany clay upland .....	81-84, 87-61, 89	Sunflower county, Mississippi, analysis of soil of .....	16
sandy upland .....	68	Supplies produced at home or imported, or whence obtained ..	43, 103
buckshot lands .....	48, 52, 54, 59, 61, 69	Sutton, W. J., abstract of the report of .....	23, 68
coarse black sandy .....	65	Swindle, A. E., abstract of the report of .....	70
sandy land of creeks .....	81	System best for laborers .....	104
crawfishy land .....	52, 56, 59	of farming and labor .....	103-105
creek bottom lands .....	54-70		
dark alluvial, of rivers .....	48, 64	<b>T.</b>	
clay loam uplands .....	60-62	Table-lands of Maury county .....	84
gravelly second bottom .....	76, 78, 79	Table showing population and cotton production in Tennes-	
gray upland .....	52, 53, 70, 71	see according to regions .....	40
loam of bottoms .....	70, 71, 81-85	Tables of analyses of soils and subsoils .....	16, 18, 20, 30-33, 44
Tennessee river .....	73	Tabulated results of the enumeration in Kentucky .....	100, 110
or blue-grass land .....	91	Tennessee .....	1-8
red upland .....	92	Tallahatchie county, Mississippi, analysis of soil of .....	16
sandy upland loam .....	49, 54-66	Tansill, E. D., abstract of the report of .....	62
fine sandy land of Elk river .....	82	Temperatures of the state .....	12
flatwoods land .....	73	Tennessee river, description of .....	70
glady land .....	57	western valley of, area, elevation, extent, and char-	
gravelly clay loam upland .....	71, 72, 76	acter of .....	23-25
upland .....	55-59	Terrace along the slopes of the Cumberland table-lands ..	36
gray cherty upland .....	92	Thinning out cotton-plants .....	99
hickory barrens .....	65	Thompson, Rev. M. F., abstract of the report of .....	33, 83
highland .....	76	Thornton, E. H., abstract of the report of .....	33, 34, 90
light clay .....	49	Thornton, J. B., abstract of the report of .....	54
sandy loam .....	48-60	Tillage, improvement, etc., details of .....	97, 98
of Central Basin .....	87, 89	Tilled area of the Mississippi river .....	15
mulatto and red gravelly poplar land .....	83-86, 89-91	land of Tennessee counties (table) .....	3-5
front lands .....	69	percentage of, devoted to cotton (table) .....	3-5
pine bottom land .....	56	in county areas (table) .....	3-5
red or mulatto clay land .....	51, 56, 60, 65, 67	per square mile in Kentucky counties (table) ..	109
white clay loam upland .....	62-64	Tilling qualities of land for any soil. ( <i>See</i> under Soils.)	
yellowish calcareous soil of rivers .....	79	Tillman, B. M., abstract of the report of .....	69
yellow sandy gravelly upland .....	70, 74, 89	Tillman, J. D., abstract of the report of .....	35, 82
soils of bottom swells .....	72	Timber growth. ( <i>See</i> regional and county descriptions.)	
Soils devoted to cotton ( <i>see</i> abstracts in county descriptions)	48-92	Time, length of, before cottonseed comes up, and when plants	
of the black prairie belt .....	21, 22	are thinned .....	99
bluff region .....	17-19	of first black frost .....	100
brown-loam table-lands .....	19-21	when bolls first open, and when cotton-picking begins	
Central Basin .....	29-35	and closes .....	100
Cumberland table-land .....	35, 36	Tipton county, statistics and description of .....	52, 53
flatwoods belt of West Tennessee .....	21	Tobacco, acreage and production of, in Kentucky (table) ..	110
Highland Rim .....	25-28	growing increases as cotton production decreases ..	40
Mississippi bottom region .....	14-16	Topographical features ( <i>see</i> county descriptions) .....	47-92
mountains .....	35-39	Topography, general, of the state .....	11, 12
mulatto lands of the Nashville series, character		Transmittal, letters of .....	iii
and analyses of .....	32, 33	Transportation companies, conditions imposed by .....	102
Orthis bed of the central region .....	31, 32	Trenton limestone, thickness of, in Central Basin .....	29
sandy pine and oak uplands .....	21, 22	Trice, W. C., abstract of the report of .....	22, 66
summit region of the water-shed .....	21, 23	Tucker, Dr. W. D., abstract of the report of .....	53
valley of East Tennessee .....	37-39	Turner, J. M., abstract of the report of .....	34, 59
western valley of the Tennessee .....	23-25		
reduced from first to third grades by improvident cul-		<b>U.</b>	
ture .....	19	Unaka Mountain region, county descriptions of .....	92
washing of ( <i>see</i> abstracts in county descriptions) .....	48-92	extent, elevation and character of ..	39, 40
Sore-shin, occurrence of, on cotton .....	99	streams, mountain chains, and peaks ..	39
Space between ridges in cotton planting .....	99		
Stewart, J., abstract of the report of .....	53	<b>V.</b>	
Storing, handling, and shipping cotton, charges for .....	105	Valley lands of East Tennessee, magnesian limestone lands of ..	38
Stoval, A. W., abstract of the report of .....	68	ridge and cherty lands of ..	38
Streams of the East Tennessee valley .....	37	of East Tennessee, county descriptions of .....	92
Unaka Mountain region .....	39	extent and descriptions of .....	36-39
Stubblefield, T. M., abstract of the report of .....	22, 23, 67	Vanderford, C. F., abstract of the report of .....	33, 89
Sub-Carboniferous rocks of the Highland Rim .....	32	Variety in natural features a characteristic of the state ..	11



# INDEX TO COTTON PRODUCTION IN TENNESSEE AND KENTUCKY. 119

	Page.		Page.
Varieties of cottonseed used.....	99	Western valley of the Tennessee river, area, elevation, extent, and character of ...	23-25
Vaughan, T., abstract of the report of.....	90	cotton production of..	41
		county descriptions of.	69-74
<b>W.</b>			
Wade, T. B., abstract of the report of .....	82	West, M. F., abstract of the report of .....	27
Wages paid to laborers.....	43, 104	Wheat, acres and production of, in Kentucky (table).....	110
Wagoner, D., abstract of the report of.....	48	Tennessee (table) .....	6-8
Walker, A., abstract of the report of .....	20, 56, 57	White, N., abstract of the report of .....	81
Washing of soils, how prevented ( <i>see</i> abstracts in county descriptions) .....	48-92	White, W. J., abstract of the report of .....	25, 74
Water-courses of the bluff or plateau region.....	17	Width of the state .....	11
Water-shed of the Tennessee river.....	21	Willet, D. L., abstract of the report of .....	22, 64
Waters of the Highland Rim .....	26	Williams, H., abstract of the report of .....	57
Watkins, D. F., abstract of the report of .....	85	Williams, J. R., abstract of the report of.....	64
Wayne county, statistics and description of.....	75	Williams, L. M., abstract of the report of .....	18
Weakley county, statistics and description of.....	61, 62	Williamson county, statistics and description of.....	85-87
Weaver, W., abstract of the report of.....	89	Wilkes, J. B., abstract of the report of.....	85
Weed, running to, of the cotton-plant, how prevented. ( <i>See</i> under Bolling.)		Wilson county, statistics and description of.....	89, 90
Weeds most troublesome, general remarks on .....	43	Wood, T. J., abstract of the report of.....	60
troublesome on any soil. ( <i>See</i> under Soils.)			
Weighing of cotton .....	105	<b>Y.</b>	
		Yarborough, J. G., abstract of the report of.....	24, 72
		Yorkley, S., abstract of the report of .....	81
		Young, J. F., abstract of the report of .....	51